

ADDITIONAL NOTES ON THE GENUS VERBENA. XII

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VERBENA [Dorst.] L.

Additional synonymy: *Vervena* Kundu & De, Bull. Bot. Surv. India 10: 399, sphalm. 1968.

Additional & emended bibliography: Virgil., Eccl. 8: v. 64--65. B.C.37; Propertius, Eleg. 4 (3): v. 57--58. B.C.26; Virgil., Aeneid 12: v. 119--120. B.C.19; Plin. Secund., Hist. Mund. Nat., lib. 22, cap. 2. A.D.77; Camer. in Matth., Pl. Epit. Util. 717. 1586; L., Mat. Med., ed. 1, 6, 208, & 218. 1749; Manetti, Virid. Florent. 98. 1751; Schreb. in L., Mat. Med., ed. 2, pr. 1, 38 & [272]. 1772; W. Curtis, Fl. Lond., ed. 1, 1 (1): pl. 41 ["42"]. 1775; O. F. Müll. in Oeder, Icon. Pl. Fl. Dan. 4: 5, pl. 628. 1775; Bulliard, Herb. France pl. 215 & table. 1785; Schreb. in L., Mat. Med., ed. 5, 41 & [324]. 1787; Mavor, Gen. View Agr. Berks. 1809; Sibth. & Sm., Fl. Graec. Prodr. 1 (2): 402. 1809; Targ.-Tozz., Diz. Bot. Ital. 2: 233. 1809; W. Curtis, Fl. Lond., ed. 2, 1 (1): pl. 41. 1817; Zerapha, Fl. Melit. Thes. 2: 77. 1831; W. Curtis, Fl. Lond., ed. 2, 3: pl. 90. 1835; Bertol., Fl. Ital. 6: 261. 1844; Schau. in A. DC., Prodr. 11: 535--557 & 736. 1847; Grech Delicata, Fl. Melit. 27. 1853; Gulia Gavino, Repert. Bot. Malt. 7. 1855; Reichenb., Icon. Fl. Germ. 18: 52--53, pl. 91 (1292) & 103. 1857; Boswell Syme in Sowerby, Engl. Bot., ed. 3, 6: 202--203, pl. 1018. 1866; Nyman, Consp. Fl. Eur. 563. 1881; Arcang., Compend. Fl. Ital., ed. 1, 561 & 885. 1882; Baker & Newbould in H. C. Wats., Topogr. Bot., ed. 2, 302. 1883; Druce, Fl. Oxf. 224. 1886; Arcang., Compend. Fl. Ital., ed. 2, 444--445 & 31. 1894; T. Cooke, Fl. Presid. Bomb. 2: 437. 1908; Hatton, Craftman's Plant-book 4, 368, 369, & 538, fig. I & 729. 1909; Dur. & Barr., Fl. Lib. Prodr. 193. 1910; Béguinot & Vacc., Monog. Rapp. Colon. Minist. Aff. Est. Roma 16: [Contrib. Fl. Libia] 62. 1912; Hubert, Verbénac. Util. Mat. Méd. 8--15. 1921; Holste, Arch. Exp. Path. Pharmakol. 101: 46. 1924; Pamp., Libya 3: 145. 1927; Miller, Journ. Am. Pharm. Assoc. 17: 744. 1928; Grove, Brit. Stem- & Leaf-fungi, pr. 1, 1: 414 & 470. 1935; Noack, Biol. Zentralbl. 57: [383]--388, fig. 1--17. 1937; Cheymol, Bull. Soc. Chem. 5: 633 & 642. 1938; Furusato, Bot. & Zool. Theoret. & Appl. [Syokobutu Oyobi Dobutu] 8: [1303]--1311 (39--47). 1940; W. Hoffm., Arch. Pharm. 231: 269. 1943; E. L. D. Seymour, New Gard. Encycl., ed. 3, 1279 & 1281 (1944) and ed. 4, 1279 & 1281. 1946; E. L. Jordan, Hamond Nat. Atl., pr. 1, 2, & 3, 219 (1952) and pr. 4, 5, & 6, 219. 1953; Schnack & Solbrig, Revist. Fac. Agr. La Plata 29: [255]--266, fig. 1--4. 1953; E. L. Jordan, Hamond Nat. Atl., pr. 7, 219 (1954), pr. 8, 219 (1955), pr. 9 & 10, 219 (1956), pr. 11, 219 (1957), pr. 12, 219 (1958), and pr. 13, 219. 1959; Hatton, Handb. Pl. & Flor. Ornament 4, 368--369, & 538, fig. I & 729. 1960; Büchi & Manning, Tetrahedron Lett. 1960: 5. 1960; E. L. Jordan, Hamond Nat. Atl., pr. 14, 219 (1961) and pr. 15, 219. 1962;

Büchi & Manning, *Tetrahedron* 18: 1049. 1962; Newcomb, *Pocket Key Comm. Wild Fls.* 24, 56, 64, & 65. 1963; E. L. D. Seymour, *New Gard. Encycl.*, ed. 6, 1279 & 1281, pl. 59 (1963) and ed. 7, 1279 & 1281, pl. 59. 1964; E. L. Jordan, *Hamond Nat. Atl.*, pr. 17, 219 (1964) and pr. 18, 219. 1965; Huynh, *Denkschr. Schweiz. Naturforsch. Gesel. [Mém. Soc. Helv. Sci. Nat.]* 85: 100. 1965; E. L. Jordan, *Hamond Nat. Atl.*, pr. 19, 219 (1966) and pr. 20, 219. 1967; Grove, *Biblioth. Mycol.* 42: 444 & 470. 1967; Kundu & De, *Bull. Bot. Surv. India* 10: 399. 1968; R. I. Patel, *For. Fl. Melghat* 271. 1968; E. L. Jordan, *Hamond Nat. Atl.*, pr. 21, 219. 1969; E. L. D. Seymour, *New Gard. Encycl.*, ed. 8, 1279 & 1281. 1970; Angely, *Fl. Anal. Fitogeogr. Est. S. Paulo*, ed. 1, 4: 825, 826, 836--840, & xix, maps 1391--1395. 1970; Reed & Hughes, *Common Weeds U. S.*, pr. 1, 306--309, fig. 151 & 152 (1970) and pr. 2, 306--309, fig. 151 & 152. 1971; Hocking, *Excerpt. Bot. A.* 18: 444. 1971; E. L. Jordan, *Hamond Nat. Atl.*, pr. 22, 219. 1971; Vyas & Garg, *Zeit. Pflanzenphysiol.* 65: 189--194. 1971; Priszter, *Delect. Sem. Spor. Pl. Hort. Bot. Univ. Hung.* 59 & 81. 1971; C. D. Adams, *Flow. Pl. Jam.* 626--628, 630--632, & 846. 1972; Anon., *Biol. Abstr.* 53 (3): B.A.S.I.C. S.271. 1972; Vyas & Garg, *Biol. Abstr.* 53: 1650. 1972; Moldenke, *Phytologia* 23: 211--247. 1972.

The Sibthorp & Smith reference (1809) is often cited as "1806", but pages 219--442 of this work were issued in 1809. The Boswell Syme reference (1866) is sometimes cited as "1863", but volume 6 of this edition was not issued until 1866.

#### VERBENA ALATA Sweet

Additional bibliography: Angely, *Fl. Anal. Fitogeogr. Est. S. Paulo*, ed. 1, 4: 838 & xix. 1970; Moldenke, *Phytologia* 23: 213. 1972.

#### VERBENA AMBROSIFOLIA Rydb.

Additional & emended bibliography: Darlington & Wylie, *Chrom. Atl.*, pr. 1, 323 (1956) and pr. 2, 323. 1961; Moldenke, *Phytologia* 23: 213 & 228. 1972.

#### VERBENA BERTERII (Meisn.) Schau.

Additional bibliography: Moldenke, *Phytologia* 23: 182 & 230. 1972.

Additional citations: CHILE: Colchagua: Zöllner 5351 (Ac).

#### VERBENA BIPINNATIFIDA Nutt.

Additional bibliography: Vyas & Garg, *Zeit. Pflanzenphysiol.* 65: 189--194. 1971; Vyas & Garg, *Biol. Abstr.* 53: 1650. 1972; Moldenke, *Phytologia* 23: 215--216 & 226. 1972; Anon., *Biol. Abstr.* 53 (3): B.A.S.I.C. S.271. 1972.

Vyas & Garg (1971) report that seeds of this species stored dry for 47 weeks developed light sensitivity. "GA at a 100-ppm concentration and 30 C incubation temperature provided the optimum conditions for germination. GA was capable not only of bypassing the light requirements but also of overcoming some of the temperature blocks of germination. Coumarin and far-red reversed the stimula-

tion caused by GA. Preheating of seeds at 60 C abolished subsequent GA sensitivity of germination of those seeds in the dark. Nitrogenous substances accelerated the dark germination of the seeds induced by GA." "GA", of course, is gibberelic acid.

VERBENA BONARIENSIS L.

Additional & emended bibliography: Noack, Biol. Zentralbl. 57: 384 & 386, fig. 11. 1937; Darlington & Wylie, Chron. Atl., pr. 1, 323 (1956) and pr. 2, 323. 1961; Huynh, Denkschr. Schweiz. Naturforsch. Gesel. [Mém. Soc. Helv. Sci. Nat.] 85: 100. 1965; Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1, 4: 838 & xix, map 1391. 1970; Moldenke, Phytologia 23: 216--217 & 233. 1972; C. D. Adams, Flow. Pl. Jam. 627, 628, & 846. 1972.

Additional illustrations: Noack, Biol. Zentralbl. 57: 386, fig. 11. 1937.

Adams (1972) states that in Jamaica this species is "Locally common.....at roadsides and in old cultivations or gravelly waste open places", growing at altitudes of 1700 to 5200 feet, flowering and fruiting for most of the year. He gives its overall distribution as "Native of subtropical S. Amer., introduced into Bermuda, United States, Puerto Rico and elsewhere and escaping from cultivation". He cites from Jamaica Adams 6431, Harris 9132, Jamaican Plants 1169, and Proctor 23518.

VERBENA BONARIENSIS var. CONGLOMERATA Briq.

Additional bibliography: Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1, 4: 838 & xix. 1970; Moldenke, Phytologia 23: 217. 1972.

VERBENA BRACTEATA Lag. & Rodr.

Additional & emended bibliography: Noack, Biol. Zentralbl. 57: [383], 384, & 386, fig. 6. 1937; Reed & Hughes, Common Weeds U. S., pr. 1, 306--307, fig. 151 (1970) and pr. 2, 306--307, fig. 151. 1971; Moldenke, Phytologia 23: 217, 234, 237, & 239. 1972.

Additional illustrations: Noack, Biol. Zentralbl. 57: 386, fig. 6. 1937; Reed & Hughes, Common Weeds U. S., pr. 1, 307, fig. 151 (1970) and pr. 2, 307, fig. 151. 1971.

VERBENA BRASILIENSIS Vell.

Additional bibliography: Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1, 4: 838 & xix, map 1391. 1970; Moldenke, Phytologia 23: 217--218, 233, & 241. 1972.

Bayliss describes this plant as 15 inches tall, with rough stems and leaves, growing in sandy grasslands in South Africa.

Additional citations: SOUTH AFRICA: Cape Province: Bayliss BS.3045 (W--2616807).

VERBENA CANADENSIS (L.) Britton

Additional & emended bibliography: Noack, Biol. Zentralbl. 57: 384 & 387, fig. 15. 1937; E. L. D. Seymour, New Gard. Encycl., ed. 3, 1279 (1944), ed. 4, 1279 (1946), and ed. 5, 1279. 1951; Darlington & Wylie, Chron. Atl., pr. 1, 323. 1956; E. L. D. Sey-

mour, New Gard. Encycl., ed. 6, 1279 (1963), ed. 7, 1279 (1964), and ed. 8, 1279. 1970; Moldenke, *Phytologia* 23: 218--219 & 242. 1972.

*VERBENA CORYMBOSA* Ruiz & Pav.

Additional & emended bibliography: Noack, *Biol. Zentralbl.* 57: 384 & 386, fig. 12. 1937; Darlington & Wylie, *Chrom. Atl.*, pr. 1, 323 (1956) and pr. 2, 323. 1961; Moldenke, *Phytologia* 23: 220. 1972.

Additional illustrations: Noack, *Biol. Zentralbl.* 57: 386, fig. 12. 1937.

Although the Darlington & Wylie work (1956) cited above and in the bibliographies of various other species is often cited as "1955" and appears to be so dated by the Library of Congress, the title-page date is "1956" and Mr. Reed, Librarian of the New York Botanical Garden, states that he sees no reason for adopting the earlier date.

*VERBENA CRITHMIFOLIA* Gill. & Hook.

Additional & emended bibliography: Darlington & Wylie, *Chrom. Atl.*, pr. 1, 323 (1956) and pr. 2, 323. 1961; Bolkh., Grif, Matvejev., & Zakhar., *Chrom. Numb. Flow. Pl.* 715 & 716. 1969; Moldenke, *Phytologia* 23: 195. 1972.

*VERBENA DISSECTA* Willd.

Additional & emended bibliography: Darlington & Wylie, *Chrom. Atl.*, pr. 1, 322 (1956) and pr. 2, 322. 1961; Angely, *Fl. Anal. Fitogeogr. Est. S. Paulo*, ed. 1, 4: 838 & xix. 1970; Moldenke, *Phytologia* 23: 222--224. 1972.

*VERBENA DOMINGENSIS* Urb.

Additional bibliography: Moldenke, *Phytologia* 23: 224. 1972.

Additional citations: *HISPANIOLA*: Dominican Republic: Gastony, Jones, & Norris 363 (W--2657619).

*VERBENA EPHEROIDES* Cham.

Additional synonymy: *Verbena sphedroides* Angely, *Fl. Anal. Fitogeogr. Est. S. Paulo*, ed. 1, 4: xix, sphalm. 1970.

Additional bibliography: Angely, *Fl. Anal. Fitogeogr. Est. S. Paulo*, ed. 1, 4: 839 & xix, map 1392. 1970; Moldenke, *Phytologia* 23: 230. 1972.

*VERBENA FILICAULIS* Schau.

Additional bibliography: Angely, *Fl. Anal. Fitogeogr. Est. S. Paulo*, ed. 1, 4: 839 & xix, map 1392. 1970; Moldenke, *Phytologia* 23: 231. 1972.

*VERBENA FLAVA* Gill. & Hook.

Additional & emended bibliography: Darlington & Wylie, *Chrom. Atl.*, pr. 1, 322 (1956) and pr. 2, 322. 1961; Moldenke, *Phytologia* 23: 231--232. 1972.

## VERBENA GRACILESCENS (Cham.) Herter

Additional synonymy: Verbena offinalis var. gracilescens Cham. ex Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1, 4: 839, sphalm. 1970.

Additional & emended bibliography: Darlington & Wylie, Chrom. Atl., pr. 1, 323 (1956) and pr. 2, 323. 1961; Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1, 4: 839. 1970; Moldenke, Phytologia 23: 237--238. 1972.

## VERBENA HASTATA L.

Additional & emended bibliography: Noack, Biol. Zentralbl. 57: 384--386, fig. 1. 1937; E. L. D. Seymour, New Gard. Encycl., ed. 3, 1279 (1944), ed. 4, 1279 (1946), ed. 5, 1279 (1951), and ed. 6, 1279. 1963; Newcomb, Pocket Key Comm. Wild Fls. 56, 64, & 65. 1963; E. L. D. Seymour, New Gard. Encycl., ed. 7, 1279 (1964) and ed. 8, 1279. 1970; Domville & Dunbar, John Burroughs Nat. Hist. Soc. Bull. 8: 94. 1970; Duncan & Stuckey, Mich. Bot. 9: 190. 1970; El-Gazzar & Wats., New Phytol. 69: 483 & 485. 1970; Harrington in Frankel & Bennett, Genetic Resources 516. 1970; Joyal, Natur. Canad. 97: 577. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1314 & 1319. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876 & 1877. 1970; Rickett, Wild Fls. U. S. 4 (3): 540, [543], & 799, pl. 177. 1970; Wise, Rhodora 72: 524. 1970; Youngken & Tashiro, Rep. Contr. Research Prop. U. S. Army Med. Res. Develop. Command Washington Contract DA49193MD3037. 1970; Brown & Wherry, Bartonica 40: 13. 1971; Cody, Ind. Sem. Bot. Gard. Ottawa 1971: 20. 1971; Cochrane, W. E. & M. M. Rice, Mich. Bot. 10: 183. 1971; Farnsworth, Pharmacog. Titles 5: Cumul. Gen. Ind. 1971; Farnsworth, Pharmacog. Titles 7 (7): xiv & title 12547 (1971) and 7 (8): xix & title 15169. 1971; Krochmal, Walters, & Doughty, U. S. Dept. Agr. Forest Serv. Agric. Handb. 400, pr. 2, 9, 266, & 267. 1971; Ownbey & Monserud, Common Wild Fls. Minn. 312. 1971; Rickett, Wild Fls. U. S. 5 (2): [455], 456, & 665, pl. 152. 1971; Thilenius, U. S. Dept. Agr. Forest Serv. Res. Paper RM.71: 42. 1971; Moldenke, Fifth Summ. 1: 14--23, 25, 27, 30, 34--43, 45, 49--53, 59, 62, 63, 101, 203--205, & 370 (1971) and 2: 548, 649--652, 656, 660, 661, 668, 669, 672--674, 679, 686, 688, 690, 695, 696, 698, 702, 704, 705, 708, 732, 793, 915, & 967. 1971; Moldenke, Phytologia 22: 497 (1972) and 23: 195. 1972.

Additional & emended illustrations: Britton & Br., Illustr. Fl., ed. 2, pr. 1, 3: 95, fig. 3554. 1913; C. A. Reed, Flow. Guide, pr. 1, 152 [in color]. 1916; H. L. Keeler, Wayside Fls. Sum. 174. 1917; C. A. Reed, Flow. Guide, pr. 2, 152 [in color]. 1923; Pammel & King, Iowa Geol. Surv. Bull. 4 (rev.): 267 & 268, fig. 152 & 152A. 1926; Britton & Br., Illustr. Fl., ed. 2, pr. 2, 3: 95, fig. 3554. 1936; Noack, Biol. Zentralbl. 57: 386, fig. 1. 1937; F. H. & H. H. Hillman, Seed Trade Buyers Guide 1938: 137, pl. 12, fig. 6. 1938; Fischer & Harshberger, Flower Fam. Alb. 87. 1941; Britton & Br., Illustr. Fl., ed. 2, pr. 3, 3: 95, fig. 3554. 1943; Harvey, Erickson, & Larson, Seed Trade Buyers Guide 1945: 86. 1945; Britton & Br., Illustr. Fl., ed. 2, pr. 4, 3: 95,

fig. 3554. 1947; Abrams, *Illustr. Fl. Pacific States*, pr. 1, 3: 608, fig. 4341. 1951; Hitchc., Cronq., & Ownbey, *Vasc. Pl. Pacific Northwest 4*: 246. 1959; Martin & Barkley, *Seed Ident. Man.* 37, pl. 235, & 194, fig. 260. 1961; Hylander, *Fls. Field & Forest* 187, fig. 6. 1962; Roulcau in Marie-Victorin, *Fl. Laurent.*, ed. 2, 489, fig. 170. 1964; F. H. Montgomery, *Plants from Sea to Sea* 261, fig. 528. 1966; Yotaro, *Gard. Pl. World* 3: pl. 64, fig. 3 [in color]. 1966; Abrams, *Illustr. Fl. Pacific States*, pr. 2, 3: 608, fig. 4341. 1967; Gilkey & Dennis, *Handb. NW. Pl.* 352. 1967; Bulkeley, *Berkshire Week Aug.* 10-18, p. [17A]. 1968; W. C. Grimm, *Recog. Flow. Wild Pl.* 229. 1968; Hinds & Hathaway, *Wildfls. Cape Cod* 152, fig. 138. 1968; Peterson & McKenry, *Field Guide Wildfls.* [317] (in color). 1968; Krochmal, Walters, & Doughty, *U. S. Dept. Agr. Forest Serv. Agric. Handb.* 400, pr. 1, 267. 1969; Krochmal, Walters, & Doughty, *U. S. Dept. Agr. Forest Serv. Res. Paper NE.* 138: 267. 1969; Rickett, *Wild Fls. U. S.* 3 (2): [367], pl. 111 [in color] (1969) and 4 (3): [543], pl. 177 [in color]. 1970; Britton & Br., *Illustr. Fl.*, ed. 2, pr. 5, 3: 95, fig. 3554. 1970; Ownbey & Monserud, *Common Wild Fls. Minn.* 312. 1971; Rickett, *Wild Fls. U. S.* 5 (2): [455], pl. 152 [in color]. 1971.

The Madroff (1960) reference in the bibliography of this species is sometimes credited to Solbrig, while Bolkhovskikh (1969) cites it as "Darlington, Document. Chrom. Numb. Pl. ....", but it appears to be a continuation of a series begun by Rattenbury and not otherwise accredited since then.

Weber (1967) characterizes *V. hastata* as follows: "Spikes slender, acute at the apex; leaves deep green; flowers deep blue or purple" and describes its habitat as "Swamps and irrigation ditches, piedmont valleys and plains. Common, flowering in late summer" in the Rocky Mountains region. Harrington (1970) has found that its seeds have a life span of 39 years. Poindexter 195-14 was used to determine a chromosome count of  $n = 7$  and pollen fertility of 99 percent. Ownbey & Monserud (1971) report that the corollas are "sometimes violet or pink", implying that the normal form is blue. Gilkey & Dennis (1967) describe the flowers as "purplish-blue, opening upward on the spike, only a few flowers of a spike open at one time". Cumbie 89 was used for anatomical studies.

Gattinger (1894) tells us that in Tennessee this species is "Very common in sandy soils", flowering in July, "The herb and root used medicinally".

Grimm (1968) describes the inflorescence as follows: "The small violet-blue flowers, hardly more than 1/8 inch across, are arranged in several long and very slender clusters at the tip of the stem and its branches" and says of the plant that "It is usually common in moist fields, meadows, and along streams; blooming between June and September", giving its range as "N. B. to B. C. south to Fla., Tex., and Calif." Hitchcock, Cronquist, & Ownbey (1959) describe the corolla [of what is probably var. scabra] as "blue or violet" and give its habitat in the Pacific Northwest as "Ditch banks and moist low ground" and its range as "B. C. to

N. S., s. to Calif., Ariz., and Fla.", blooming from July to September. Hausman (1948) describes the corollas as "violet-blue, rarely white or pink" and describes the habitat as "Moist fields, meadows, roadsides, waste places. Nova Scotia south to Florida: west to British Columbia, Nebraska, Arizona. June—Sept.". Violet-purple actually seems to be the corolla color in the typical form of this species, but this color usually appears as blue to observers who are red-colorblind. There are, however, distinct blue-flowered, pink-flowered, and white-flowered forms.

Recent collectors have found this plant growing on brushy hillsides, in damp open weedy fields, in cattail thickets along rivulets (in Missouri), in sandy muck (in Oklahoma), on lake margins and in deep sand of dune areas (in Texas), and in damp soils generally. Lowe (1921) found it in "low damp open pastures" in Benton and Pontotoc Counties, Mississippi; Wheeler (1900) records it from Houston County, Minnesota; Dobbs (1963) describes it as "Frequent to common on moist shores and in low moist to wet depressions" in Henry County, Illinois. Rickett (1969) describes its habitat and distribution as "in meadows, fields, prairies, swamps from Nova Scotia across Canada and southward to Florida, Tennessee, Missouri, northern Texas, and California" and comments that "This has been called simpler's-joy, from some medicinal use" [actually this name belongs to V. officinalis L. and has been misapplied to the American V. hastata only in books].

Poindexter encountered V. hastata in "areas characterized by sandy wastes and stabilized sand dune pastures". Radford, Ahles, & Bell (1964) record it from Ashe, Orange, Warren, Washington, and Watauga Counties, North Carolina, and report that the plant grows there in low fields, bogs, and marshes, and is infrequent in North Carolina, blooming there from June to October. Lakela (1965) cites Lakela 11172 & 15624 from Minnesota, while Hutton, Miller, & Conrad (1968) record it from Jefferson County, West Virginia, and Wherry (1967) from Delaware County, Pennsylvania. Hopkins (1969) cites his no. 1022 from Pope County, Illinois, and Mohlenbrock (1968) also reports it from that county; Domville & Dunbar (1970) describe it as "common in damp places" in Ulster County, New York, flowering there "in summer", while Ownbey & Monsrud (1971) aver that it inhabits "Pastures, wet meadows and swamps.....throughout the state" of Minnesota. Cochrane (1971) refers to it as "common" in "low open ground" in Rock County, Wisconsin, while Jantzen (1960) reports it from Stafford County, Kansas.

Lowden (1969) found it growing on Squaw Island, Ohio; Joyal (1970) cites Joyal 1217 and Rouleau 1125 from Soeur Island, Quebec; Wise (1970) found it on Isle au Haut in the outermost part of Penobscot Bay, Knox County, Maine, while Duncan & Stuckey (1970) tell us that it was once on Big Chicken and Green Islands, Michigan, since they saw it there in 1939, but that it had disappeared from both islands by 1970. Howell & McClintock (1960) cite Macdougall 566 from Coconino County and Covers & Palmer 279 and Toumey s.n. from Yavapai County, Arizona. St. John (1962)

says that the species is "occasional in meadows and streambeds, Upper Sonoran life zone" in southeastern Washington and adjacent Idaho and in his 1937 work that it is "occasional, meadows and stream banks" in southwestern Washington — in both cases it is undoubtedly var. scabra Moldenke to which reference is being made.

Winter and his associates (1959) state that V. hastata grows in "moist valleys and draws over the state" of South Dakota, Bartley (1959) records it from Jackson County, Ohio, and Tatnall (1946) avers that it is "common in meadows" in the Piedmont and on the Coastal Plain of Delaware and Maryland "as far south as Wicomico Co.", blooming there from "late June through August". Swink (1969) tells us that it is found in "All 22 counties" of the Chicago region and is there "Frequent in marshy ground, associating with Asclepias incarnata, Boehmeria cylindrica, Calamagrostis canadensis, Eupatorium maculatum, Eupatorium perfoliatum, Impatiens capensis, Leersia oryzoides, Lycopus americanus, Lythrum alatum, Penthorum sedoides, Scirpus americanus, Scirpus atrovirens, and Typha latifolia. In moist meadows its associates include Agrostis alba, Aster novae-angliae, Carex vulpinoidea, Geum laciniatum trichocarpum, Helianthus grosseserratus, Phlox glaberrima interior, Pycnanthemum virginianum, Spartina pectinata, and Veronicastrum virginicum." Montgomery (1966) gives its Canadian distribution as "N. S. to B. C.", which agrees with what most authors state. Wunderlin (1966) affirms that it is "local in open ground" in Carroll County, Illinois, and cites his nos. 148 and 208, while Rouleau (1964) tells us that it occurs only in western and central Quebec and Sexsmith (1965) records it from Grosse Ile in that province.

Fischer & Harshberger (1941) describe the flowers of this plant very interestingly: "The individual flowers attempt to be 2-sided like the mints but have never quite succeeded in getting their mouths open". Ward (1967) almost unbelievably reduces V. hastata to synonymy under V. officinalis L.!

Dobbs (1963) reports that V. hastata is "One of the many old time medicinal plants and still said to be of some commercial importance, the herb being used"; Krochmal, Walters, & Doughty (1969) say that in Appalachia the "herbaceous parts [of this plant are] reportedly used as an astringent, antipyretic, vulnerary, antirheumatic, tonic, and expectorant", while Uphof (1968) says "Dried herb, collected at flowering time, used medicinally as expectorant, diaphoretic. Contains verbenalin, a glucoside". Others have reported that the root is used as an emetic, tonic, expectorant, sudorific, and vulnerary, and that it contains irritant properties. Chemists report that the plant contains glucosides, verbenalin, a bitter principle, and tannin. Verbenaloid is reported from it by Cheymol (1937).

Keeler (1917) has found that V. hastata is pollinated by bees and flies and is nectar-bearing. Shinn (1967) found it to be visited regularly by the bee, Calliopsis nebraskensis. Streams and his associates (1968) report that nymphs of the tarnished



plant-bug infest it in Connecticut, as they also do V. urticifolia, Erigeron annuus, E. strigosus, Oenothera biennis, Daucus carota, and species of Solidago, and are there parasitized by the wasp, Leiophron pallipes, forming a biologic control of the bug that would otherwise spread from weeds to cultivated crops.

Hirata (1966) records the powdery mildew, Erysiphe cichoracearum P. DC., infesting V. hastata in Canada and the United States, while Thornberry (1966) records the same fungus and also the following: Phyllosticta verbenicola G. Martin (in New Jersey), Puccinia vilfae Arth. & Holw. (a rust) in South Dakota and from Indiana to Oklahoma, and Septoria verbenae Rob. (a leaf-spot) from Vermont to Mississippi, Texas, and South Dakota.

Savage (1945) tells us that in the Linnean Herbarium, London, sheet 12 under genus 35 is labeled "hastata" in Linnaeus' own handwriting. The "blue vervain" illustrated by Pellett (1931) is surely V. stricta Vent., rather than V. hastata!

Additional common names reported for Verbena hastata, besides those previously recorded by me, are "American blue vervain", "simples joy", "tall vervain", "tall wild verbena", and "verbain".

Material of V. hastata has been misidentified and distributed in some herbaria as V. engelmannii Moldenke, Veronica longifolia L., and Teucrium canadense var. occidentale (A. Gray) McClintock & Epl. On the other hand, the Prater 60 and A. E. Radford 541, distributed as V. hastata, are actually V. bonariensis L.; J. A. Duke 0196 is V. brasiliensis Vell.; Lindzey 253 is V. canadensis (L.) Britton; Cory 50298, Daubermire s.n. [August 1, 1933], Dillon 842, Elmer 532, L. F. Henderson s.n. [June 19, '92], Kreager 469, E. P. Sheldon s.n. [S.11167], Stephens & Brooks 25064, and D. R. Swingle s.n. [July 21, 1933] are V. hastata var. scabra Moldenke; Mahler 861 is V. macdougalii Heller; Drummond s.n. [St. Louis, N. Am.] is xV. moechina Moldenke; Hapeman s.n. [Minden, Aug. 23, 1939] is xV. perriana Moldenke; Bolen 59 is V. pumila Rydb.; B. Martin 86 is V. stricta Vent.; Barkley & Ha'if 4003 is V. supina L.; and H. B. Parks s.n. [June 23, 1946] is V. xutha Lehm. The G. N. Jones 17655, cited below, has its leaves slightly roughened and may possibly be var. scabra.

Additional citations: QUEBEC: Huntingdon Co.: Ernest & LeBlanc 61-200 (Go). ONTARIO: Carleton Co.: Senn 1958 (Id). MAINE: Cumberland Co.: H. N. Moldenke 18893 (Se--184850). NEW HAMPSHIRE: Cheshire Co.: Ottley 5750 (Ik). Merrimack Co.: Barkley & Courtney 40US039 (Ac, Go). VERMONT: Chittenden Co.: S. F. Blake 1957 [Herb. Blake 3058] (Id). MASSACHUSETTS: Berkshire Co.: Jones & Jones 17129 (N). NEW YORK: Jefferson Co.: J. I. Northrop s.n. [Thousand Islands, July 16, 1889] (N). Otsego Co.: Collector undetermined s.n. [E. Springfield, 7.76] (N). Seneca Co.: Chickering s.n. [Ovid, July 1857] (W--2605971). NEW JERSEY: Morris Co.:

Moldenke & Moldenke 25633 (Ac, Ft, Rf, Z). Somerset Co.: A. L. Moldenke s.n. [August 2, 1969] (Ps--1019); H. N. Moldenke 8090 (Se--113522). Union Co.: A. L. Moldenke s.n. [Mountainside, Aug. 20, 1968] (Ps--394). PENNSYLVANIA: Huntingdon Co.: H. A. Wahl 1388 (Se). MARYLAND: Montgomery Co.: Killip 36741 (Au--122289). DISTRICT OF COLUMBIA: Sudworth 605 (Mi), s.n. [22 June 1890] (Mi). WEST VIRGINIA: Preston Co.: Davis & Davis 8974 (Se--127868). OHIO: Butler Co.: J. Ferguson s.n. [July 19, 1932] (Go). ILLINOIS: Champaign Co.: R. A. Conover s.n. [August 7, 1946] (N). Cook Co.: H. R. Bennett s.n. [August 24, 1957] (Se--178943). McHenry Co.: H. R. Bennett s.n. [August 31, 1957] (Se--180360). Tazewell Co.: V. H. Chase 3229 (Se--201149). INDIANA: Greene Co.: Friesner 22294 (Au--122284). Pulaski Co.: Friesner 9768 (Sd--31744). IOWA: Allamakee Co.: Snead s.n. [August 12, 1946] (Au--122285). KENTUCKY: Bath Co.: M. E. Wharton 3226 (Mi). Estill Co.: M. E. Wharton 3015 (Mi). Jefferson Co.: Gunn 2020 [South. App. Bot. Club 19: 1831] (W--2433751). Lewis Co.: M. E. Wharton 5086 (Mi). Madison Co.: M. E. Wharton 5633b (Mi). MICHIGAN: Branch Co.: C. A. Brown 2605 (N). St. Joseph Co.: H. R. Bennett 2707 (W--2445852). WISCONSIN: Dane Co.: G. N. Jones 17655 (N). Dodge Co.: Preston 19 (Ws). Grant Co.: Beetham s.n. [Sept. 19, 1966] (Ws). Manitowoc Co.: Demler 30 (Ws). Rock Co.: P. J. Scott s.n. [9-17-66] (Ws). MINNESOTA: Martin Co.: Bartlett & Grayson 1382 (N). Murray Co.: Jensen-Haarup s.n. [Slayton, summer 1913] (Ac). Ramsey Co.: S. F. Blake 161 [Herb. Blake 1200] (Id). KANSAS: Reno Co.: Poindexter 195-14 (N). MISSOURI: Clark Co.: J. A. Steyermark 68918 (N). St. Louis: Muehlenbach 3695 (Ac). NEBRASKA: Dundy Co.: Richardson & Robertson 1256 (N). OKLAHOMA: Harper Co.: Stratton 3368 (Lk). TEXAS: Hemphill Co.: Cumbie 89 (Lk); E. L. Reed 4034 (Lk); C. M. Rowell 10596 (Lk). Oldham Co.: York & Rodgers 363 (Lk). LOCALITY OF COLLECTION UNDETERMINED: Herb. A. Brown s.n. (N).

VERBENA HASTATA f. ALBIFLORA Moldenke

Additional bibliography: Hausman, *Begin. Guide Wild Fls.* 303. 1948; Moldenke, *Phytologia* 16: 91. 1968; Moldenke, *Fifth Summ.* 1: 16--18, 37, 40, & 45 (1971) and 2: 650, 673, & 915. 1971.

VERBENA HASTATA f. CAERULEA Moldenke

Synonymy: Verbena americana, spici multiplici, foliis urticae angustissimis, floribus caeruleis Tourn., *Compl. Herb.* 358. 1719.

Bibliography: Tourn., *Compl. Herb.* 358. 1719; Hocking, *Excerpt. Bot. A.* 9: 290. 1965; Moldenke, *Phytologia* 13: 200. 1966; Moldenke, *Fifth Summ.* 1: 15 (1971) and 2: 649--651 & 915. 1971.

Many authors have spoken of the corollas of Verbena hastata L. as being "blue", and the standard common name for the species is

"Blue Vervain". In reality, the corollas of the typical and widespread form of the species are violet-purple, but usually appear as blue to persons who are more or less colorblind to red. It is not certain how widely the truly blue color-form of the species is distributed since only the reports of definitely non-colorblind observers can be relied on in this matter.

VERBENA HASTATA f. ROSEA Cheney

Additional bibliography: Graves, Eames, Bissell, Andrews, Harger, & Weatherby, Bull. Conn. Geol. & Nat. Hist. Surv. 14: [Cat. Flower. Pl. Conn.] 331. 1910; Harger, Bull. Conn. Geol. & Nat. Hist. Surv. 48: 74. 1930; Hausman, Begin. Guide Wild Fls. 303. 1948; Dobbs, Fl. Henry Co. 230. 1963; Moldenke, Phytologia 14: 285. 1967; F. C. Seymour, Fl. New Engl. 456. 1969; Ownbey & Monserud, Common Wild Fls. Minn. 312. 1971; Moldenke, Fifth Summ. 1: 15--19, 22, 35, 37, 40, 43, & 45 (1971) and 2: 673 & 915. 1971.

Dobbs (1963) records this form from "low moist south border of Shadow Lake", Henry County, Illinois. Ownbey & Monserud (1971) record it from Minnesota, but, unfortunately, do not give a precise locality.

VERBENA HASTATA var. SCABRA Moldenke

Synonymy: Verbena hastata scabra Moldenke ex Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876. 1970.

Additional bibliography: Moldenke, Phytologia 16: 91. 1968; Munz, Suppl. Calif. Fl. 101. 1968; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1314 & 1319. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876. 1970; Moldenke, Fifth Summ. 1: 15, 40--43, 50, 52, 59, 62, 64, & 65 (1971) and 2: 674, 793, & 915. 1971.

Recent collectors have found this variety growing in wet meadows, on sandhill prairies, and in roadside ditches, flowering and fruiting in September and October. Crampton describes it as a perennial; Cory calls it "abundant in moist floodplain of river", growing to 18 dm. tall, while Andrew & Alison Moldenke refer to it as a "weed in horse pasture, sympatric, no hybrids". The only recorded common name for it is "blue vervain" and it has hitherto been misidentified as typical V. hastata L.; in fact, the Dillon 842, L. F. Henderson s.n. [June 19, '92], Kraeger 469, E. P. Sheldon S.11167, and D. R. Swingle s.n. [July 21, 1933], cited below, were previously reported by me as typical V. hastata before I recognized the validity of the variety. It is very probable that most, if not all, of the far western collections previously cited by me under V. hastata will prove to represent this variety. Munz (1968) describes the variety as "lf.-bases more rigid; lvs. conspicuously scabrous on upper surface, often ± conspicuously pubescent beneath. - Cited from Modoc, San Joaquin and Shasta cos.; to B. C., Mont."

Additional & emended citations: MANITOBA: Fisher Distr.: J. M.

Macoun s.n. [July 30th, 1884] (Pa). MINNESOTA: Hennepin Co.: Daubenmire s.n. [August 1, 1933] (Se--177625). MONTANA: Gallatin Co.: D. R. Swingle s.n. [July 21, 1933] (Se--26665). Ravalli Co.: Hitchcock & Muhlick 21937 (Se--196402). NEBRASKA: Logan Co.: Stephens & Brooks 25064 (N). TEXAS: Hemphill Co.: Cory 50298 (Mi). WASHINGTON: Grant Co.: T. H. Scheffer s.n. [July 31, 1945] (Se--102238). Okanogan Co.: Dillon 842 (Se--94450); Elmer 537 (Vt). Skamania Co.: Suksdorf 10572 (Se--118381). Stevens Co.: Kreager 469 (Se--68697). Yakima Co.: L. F. Henderson s.n. [June 19, '92] (Se--11943); Kruckeberg 2545 (Se--181162); Moldenke & Moldenke 3123 (Rf, Z). OREGON: Multnomah Co.: Gilkey s.n. [Portland, July 31, 1935] (Au--122290, Se--131497); E. P. Sheldon S. 11167 (Se--104920). CALIFORNIA: San Joaquin Co.: Crampton 3119 (Ca--1278077).

#### VERBENA HATSCHBACHI Moldenke

Additional bibliography: Angely, Fl. Anal. Paran., ed. 1, 571. 1965; Moldenke, Phytologia 13: 249. 1966; Moldenke, Fifth Summ. 1: 177 (1971) and 2: 674 & 915. 1971.

#### VERBENA HAYEKII Moldenke

Additional bibliography: J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 614. 1960; Moldenke, Phytologia 13: 249. 1966; Moldenke, Résumé Suppl. 17: 3. 1968; Moldenke, Fifth Summ. 1: 143 (1971) and 2: 691 & 915. 1971; Moldenke, Phytologia 23: 185. 1972.

Vargas Calderón describes this plant as "prostrate", while Hodge refers to it as a "creeping roadside plant, flowers blue-purple". It has been collected in fruit in December (in addition to the months previously reported by me) and material has been misidentified and distributed in herbaria under the name V. polystachya H.B.K.

Additional citations: PERU: Apurimac: Vargas Calderón 8712 (Ac). Cuzco: Vargas Calderón 20066 (Ac). Junín: Hodge 6237 (W--2612023); S. G. E. Saunders 696 (N). Lima: López Guillén 3318 (Rf).

#### VERBENA HERTERI Moldenke

Additional synonymy: Verbena herteri "Moldenke ex Herter" a-pud Hocking, Excerpt. Bot. A.8: 226. 1965.

Additional bibliography: Moldenke, Phytologia 16: 91. 1968; Moldenke, Fifth Summ. 1: 177 & 189 (1971) and 2: 674 & 915. 1971.

#### VERBENA HIRTA Spreng.

Additional bibliography: Barroso, Rodriguésia 32: 70. 1957; Angely, Fl. Anal. Paran., ed. 1, 571. 1965; Dombrowski & Kuniyoshi, Araucariana 1: 14. 1967; Moldenke, Phytologia 16: 91, 199, & 205. 1968; Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1, 4: 839, map 1392. 1970; Moldenke, Fifth Summ. 1: 177, 201, & 370 (1971) and 2: 690 & 915. 1971.

According to Hatschbach this species grows from a xylopodium. Its corollas are described as "lilac" on Hatschbach 14781 & 22487 and Hatschbach & Guimarães 18439. Barroso (1957) cites Brade 15664, Burret & Brade 16042, Occhioni s.n. [Abril de 1921], and "RB" 16458, 22564, 32898, & 35233, giving the geographic distribution of the species as São Paulo, Minas Gerais, and Rio de Janeiro. Actually it is also found in Bahia, Paraná, Rio Grande do Sul, and Santa Catarina, Brazil, as well as in Misiones, Argentina, and cultivated in Germany.

Additional citations: BRAZIL: Paraná: Angely 3579 (Ca--1276799); Hatschbach 14781 (W--2564728), 22487 (Mi); Hatschbach & Guimarães 18439 (Ac); Hatschbach & Haas 15669 (Rf); Reitz & Klein 17484 (N, W--2548331). Rio de Janeiro: Pabst 9317 [Herb. Brade 42402] (Ac). Santa Catarina: Smith & Klein 13885 (N).

#### VERBENA HIRTA var. GRACILIS Dusén

Additional bibliography: Angely, Fl. Anal. Paran., ed. 1, 571. 1965; Moldenke, Phytologia 16: 91 & 205. 1968; Moldenke, Fifth Summ. 1: 177 (1971) and 2: 915. 1971.

Additional citations: BRAZIL: Paraná: Reitz & Klein 17616 (N, W--2548333), 17883 (W--2548332).

#### VERBENA HISPIDA Ruiz & Pav.

Additional & emended bibliography: Pers., Sp. Pl. 3: 347. 1819; Steud., Nom. Bot. Phan., ed. 1, 873. 1821; Reiche & Phil., Fl. Chil. 5: 283 & 284. 1910; Noack, Biol. Zentralbl. 57: 384 & 386, fig. 9. 1937; Cheymol, Bull. Soc. Chim. Biol. 19: 1647--1653. 1937; Anon., Chem. Abstr. 32: 2977. 1938; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 613, 615, & 622. 1960; Padmanabhan, Phytomorph. 14: 449. 1964; Meyer & Weyrauch, Inst. Mig. Lill. Misc. 23: 64 & 123. 1966; Alzate, Fl. Medic., ed. 7, 264--265. 1968; Kunkel, Willdenovia 4: 351. 1968; Moldenke, Phytologia 16: 91--92. 1968; Moldenke, Résumé Suppl. 16: 7. 1968; Farnsworth, Blomster, Quimby, & Schermerh., Lynn Index 6: 267. 1969; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 717. 1969; Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1, 4: 839. 1970; Moldenke, Fifth Summ. 1: 137, 143, 177, 184, 187, 193, 201, 203, 205, 206, & 370 (1971) and 2: 655, 665, 671, 673, 674, 679, 680, 686, 695, 702, 705, & 915. 1971.

Additional illustrations: Noack, Biol. Zentralbl. 57: 386, fig. 9. 1937.

Recent collectors have found this plant growing in the beds of dry brooks, fruiting (in addition to the months previously reported by me) in January and February. The corollas are described as "lilac" on Luna 382 & 453 and Terribile 238. The Cabrera (1957) reference in the bibliography of this species is sometimes cited as "1958".

Alzate (1968) affirms that this species can be used as a substitute for V. officinalis L. (which see) in New World medicine. Cheymol (1937) reports the isolation of stachyose from this plant.

Kunkel (1968) informs us that the so-called V. hispida Ruíz & Pav. of Reiche in Anal. Mus. Nac. Chile (1903) is actually V. litoralis H.B.K. Macbride (1960) cites the following Peruvian collections: Arequipa: Isern 165. Cajamarca: Raimondi s.n. [Casacas]. Cuzco: Herrera s.n. [Prov. de Cercado], Hicken s.n. [Sicuani], Pennell 14184, Soukup 259. Huancavelica: Stork & Horton 10820. Huánuco: Macbride 1704, Ruíz & Pavon s.n. [near Huánuco]. Junín: Killip & Smith 21855 & 21925, Macbride 1006. Lima: Raimondi s.n. [near Lima], Pennell 14582. Moquegua: Isern 166. Puno: Pennell 13409. He gives "Ecuador, Chile and Argentina" as the extra-Peruvian distribution, but, of course, it occurs also in Brazil, Paraguay, and Bolivia, is naturalized in Germany and Switzerland, and is widely distributed elsewhere in cultivation.

Material of V. hispida has been misidentified and distributed in some herbaria as Junellia sp. On the other hand, the Hodge 6237, distributed as V. hispida, is actually V. hayekii Moldenke.

Additional citations: ECUADOR: Azuay: Asplund 17805 (N). PERU: Apurímac: Vargas Calderón 8881 (Ac). Arequipa: Vargas Calderón 19426 (Ac), 19530 (Ac). Cuzco: Vargas Calderón 12722 (W--2520259), 13902 (Ac). Moquegua: Vargas Calderón 17985 (Ac). Puno: Ugent & Ugent 4543 (W--2558165). BOLIVIA: Cochabamba: R. F. Steinbach 84 (W--2533070). CHILE: Tarapacá: Zöllner 4401 (Ac). ARGENTINA: Catamarca: Luna Riso 875 (N), s.n. [11-I-1947] (N); A. Reales 1039 (N). Chaco: Buratovich 577 (N), 752 (N). Formosa: I. Morel 2908 (N), 3476 (N), 3893 (N), 4102 (N), 4394 (N), 6331 (N), 6392 (N). Jujuy: A. Reales 615 (N). Mendoza: Semper s.n. [7/V/44] (N). Salta: Luna 382 (N), 453 (N). Santiago del Estero: Balegno 96 (N); Luna 257 (N). Tucumán: A. Reales 891 (N, Rf); Terribile 238 (N).

#### VERBENA HOOKERIANA (Covas & Schnack) Moldenke

Additional & emended bibliography: J. A. Clark, Card Ind. Gen. Sp. Var. issue 191. 1945; Darlington & Wylie, Chrom. Atl., pr. 1, 323 (1956) and pr. 2, 323. 1961; Ruíz Leal, Revist. Facult. Cienc. Agrar. Mendoza 11: 173 & 174, fig. 8. 1964; Troncoso in Cabrera, Fl. Prov. Buenos Aires 5: 133 & 137. 1965; Moldenke, Phytologia 16: 92. 1968; Ruíz Leal, Biol. Abstr. 49: 3256. 1968; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 715 & 717. 1969; Moldenke, Fifth Summ. 1: 201 (1971) and 2: 521, 664, & 915. 1971; Moldenke, Phytologia 23: 195. 1972.

Additional illustrations: Ruíz Leal, Revist. Facult. Cienc. Agrar. Mendoza 11: 174, fig. 8. 1964.

Bartlett found this plant growing "in flat Larrea cuneifolia association, loess soil" in Catamarca, Argentina. It has been collected in fruit in December (in addition to the months previously reported by me). The corollas are described as having been "yellow" on P. Garcia 927, but this was probably a mistake in ob-

servation or transcription. Troncoso (1965) states that they are normally violet in color. She gives the distribution of the species as "Regiones secas y áridas del centro y oeste del país [Argentina], extendiéndose hasta el extremo más austral de las provincias fitogeográficas del Monte y Espinal", citing Bartlett 19918 (at San Isidro) and J. F. Molino s.n. (at Buenos Aires), and commenting that "Todas las citas de V. crithmifolia Gill. et Hook. dadas para el Provincia [Buenos Aires] deben referirse a esta especie". Material has been widely misidentified and distributed in herbaria, as she says, as V. crithmifolia.

Additional citations: ARGENTINA: Buenos Aires: Eyerdam, Beetle, & Grondona 23443 (Se--119015). Catamarca: H. H. Bartlett 20231 (N); Brizuela 404 (Se--130303), 614 (N), 1014 (N), 1064 (N); O' Donell & Meyer 5155 (N), 5220 (N). Córdoba: Balegno 345 (N); H. H. Bartlett 20149 (N); Sota 317 (N), 407 (N), 443 (N). La Rioja: M. P. Gomez s.n. [Herb. Inst. Miguel Lillo 106844] (N). Mendoza: Krapovickas & Cristóbal 14624 (Z). Río Negro: O'Donell 1693 (N), 1749 (N). San Luis: Varela 547 (N), 624 (N), 653 (N), 732 (N). Santiago del Estero: Balegno 210 (N, S); P. Garcia 927 (N).

#### VERBENA HUMIFUSA Cham.

Additional bibliography: Angely, Fl. Anal. Paran., ed. 1, 571. 1965; Moldenke, Phytologia 16: 92 & 100. 1968; Moldenke, Fifth Summ. 1: 177, 187, & 190 (1971) and 2: 662, 675, 692, 693, & 915. 1971.

Additional citations: PARAGUAY: Hassler 9479 (Ca--950564).

#### xVERBENA HYBRIDA Voss

Additional synonymy: xVerbena hybrida "Voss ex Rümpler" apud Hocking, Excerpt. Bot. A.8: 226. 1965.

Additional & emended bibliography: E. Twining, Ill. Nat. Ord. Pl. 2: 104, fig. 2. 1855; Paque, Fl. Anal. & Descr. Prov. Namur & Luxemb. 447. 1902; Blakeslee, Science, new ser., 48: 298--299. 1918; Tischler, Tabul. Biol. 4: 24. 1927; Gough, Gard. Book Malaya 248. 1928; Navarro de Haydon, Flor. Comun. Puerto Rico [16]. 1936; Noack, Biol. Zentralbl. 57: [383]--387, fig. 14. 1937; Scott-Moncrieff & Sturgess, Chem. Abstr. 34: 4419. 1940; Furusato, Bot. & Zool. Theoret. & Appl. [Syokobutu Oyobi Dobutu] 8: [1303]--1311 (39--47). 1940; Fischer & Harshberger, Flower Fam. Alb. 87. 1941; E. L. D. Seymour, New Gard. Encycl., ed. 3, 1279 (1944) and ed. 4, 1279. 1946; Blank, Bot. Rev. 13: 260, 287, & 288. 1947; E. L. Palmer, Fieldbook Nat. Hist., ed. 1, pr. 3, 297 & 663. 1949; E. L. D. Seymour, New Gard. Encycl., ed. 5, 1279. 1951; Bodger, Libr. Hort. Illustr. Electros of Fls. 27, 61, 95, & 105, pl. 54g, 441e, 573c, 956a, 1137f, & 3018f. 1952; Geissman & Hinreiner, Bot. Rev. 18: 133. 1952; Mauser, Samen [Zürich] 1953: 1, fig. 8053. 1953; Kuck & Tongg, Mod. Trop. Gard. 213. 1955; Thomas & Hendricks in Magill, Holden, & Ackley, Air Pollution Handb. 9: 1--44. 1956; Darlington & Wylie, Chrom. Atl., pr.

1, 323. 1956; Ledbetter, Zimmerm., & Hitchc., *Contrib. Boyce Thomp. Inst.* 20: 275 & 277. 1959; Withamfogg in Kiaer & Hancke, *Gard. Fls. in Colour*, pr. 1, 127 & 190, fig. 487--489 & 491. 1959; Howell & McClintock in Kearney & Peebles, *Ariz. Fl.*, ed. 2, 724. 1960; Buia, *Fl. Mic. Illustr. Rep. Pop. Rom.* [50] & 401, pl. 16. 1961; Darlington & Wylie, *Chrom. Atl.*, pr. 2, 323. 1961; Haramaki, *Proc. 17th Northeast. Weed Control Conf.* 213--217. 1963; S. R. & R. S. Fujimoto, *U. S. Pl. Patent* 2271. 1963; E. L. D. Seymour, *New Gard. Encycl.*, ed. 6, 1279, pl. 59 (1963) and ed. 7, 1279, pl. 59. 1964; Anon., *Hortic. Abstr.* 34: 732. 1964; Bardi, *Trop. Gard. Burle Marx* 123, pl. 177. 1964; Buckley & Cavaye, *Greenhouse Gard. Grass* 4: 20. 1964; Radford, Ahles, & Bell, *Guide Vasc. Fl. Carol.* 281 & 282. 1964; Fugii, *U. S. Pl. Patent* 2404 (1964) and 2537. 1965; Anon., *Hortic. Abstr.* 35: 518. 1965; J. & L. Bush-Brown, *Am. Gard. Book*, ed. 4, 315, 327, & 671. 1965; Haramaki, *Weed Abstr.* 14: 256. 1965; Heimans, Heinsius, & Thijsee, *Geillustr. Fl. Nederl.* 908. 1965; Mitchell & Knight, *Journ. Exper. Biol.* 16: 11. 1965; Ohwi, *Fl. Jap.* 763. 1965; Stefan, Babes, & Juga, *Lucr. Sti. Stat. Exp. Dobregea*, Vol. Omag. 1944-1964, 265--275. 1965; Yotaro, *Gard. Pl. World* 1: 131, pl. 66, fig. 1. 1965; Altman & Dittmer, *Environ. Biol.* 316, 624, & 641. 1966; Anon., *Hortic. Abstr.* 36: 582. 1966; J. G. Barton in Novác, *Pict. Encycl. Pl. & Fls.* 403 & 405, fig. 801. 1966; Burkill, *Dict. Econ. Prod. Malay Penins.* 2: 2266. 1966; T. H. Everett, *Reader's Digest Compl. Book Gard.* 113, 153, 553, & 569. 1966; Greensill, *Trop. Gardening* 79, 98, & 242. 1966; Hirata, *Host Range & Geogr. Distrib. Powd. Mild.* 276--277. 1966; Mishra, *Sci. & Cult.* 32: 199--201. 1966; Thornberry, *U. S. Dept. Agr. Agric. Handb.* 165: 479. 1966; G. Abraham, *Green Thumb Book* 195 & 220. 1967; Anon., *Hortic. Abstr.* 37: 174. 1967; Arora & Khoshoo, *Indian Journ. Genet. & Pl. Breed.* 27: 275--277. 1967; Coon, *Fragrance & Frag. Pl.* 142. 1967; H. C. D. de Wit, *Pl. World High. Pl.* 2: 183. 1967; G. W. Kelly, *Rocky Mtn. Hort.*, ed. 2, 125--127, 148, & 223. 1967; L. & M. Milne, *Living Pl. World* 212. 1967; Tingle, *Check List Hong Kong Pl.* 38. 1967; Zukowski in Pawlowskiego, *Fl. Polsk.* 11: 65. 1967; Anon., *Hortic. Abstr.* 38: 779 & 1037. 1968; Anon., *Deutsch. Gärtnerbörse* 68: 72--78. 1968; Faroy Inc. *Houston Tex. Card* 25--89. 1968; Hartmann & Kester, *Pl. Prop.*, ed. 2, 683. 1968; Horodysky, *Diss. Abstr.* 28: 4937. 1968; Horodysky, *Bioresearch Ind.* 4: 5682. 1968; Laurie, Kiplinger, & Nelson, *Commercial Flow. Forcing* 483. 1968; Moldenke, *Phytologia* 16: 187--188, 193, & 195. 1968; Moldenke, *Résumé Suppl.* 16: 6, 7, 13, & 28 (1968) and 17: 3 & 7. 1968; A. I. Moldenke, *Phytologia* 16: 455. 1968; A. & I. Nehrling, *Easy Gard. Drought-resist. Pl.* 254. 1968; Roos, *Natl. Geogr.* 133: 726 & 732. 1968; Stucchi, *Fiori* 11: 131. 1968; *Verbena Snow White*, *Northrop King Seeds* 526. 1968; R. Webber, *Early Horticult.* 133 & 208. 1968; Withamfogg in Kiaer & Hancke, *Gard. Fls. in Colour*, pr. 5, 127 & 190, fig. 487--489 & 491. 1968; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.* 717. 1969; Farnsworth, *Blomster, Quimby, & Schermerh., Lynn Index* 6: 267. 1969; Fior, *Nostr. Fl.*, ed. 3, 570. 1969; Hay & Synge, *Dict. Gard. Pl.* 49 & 369, pl. 392. 1969; Liogier, *Fl. Cub. Supl.* 123. 1969; Shumway, *Ann. Cat.*



99: 4. 1969; Rickett, Wild Fls. U. S. 3 (2): 362 (1969) and 4 (3): 539 & 799. 1970; Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1, 839. 1970; E. L. D. Seymour, New Gard. Encycl., ed. 8, 1279. 1970; Graf, Exot. Pl. Man., ed. 1, 411. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1316 & 1323--1324. 1970; Moldenke in Menninger, Flow. Vines 338. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876. 1970; Bright of America, Summersville, W. Va., 25.GC.70 Petunias & Verbenas. 1970; Anon., Biol. Abstr. 52 (16): B.A.S.I.C. S.269. 1971; Furia, Biol. Abstr. 52: 8978. 1971; G. W. Park Seed Co., Park's Flow. Book 1971: 75. 1971; Moldenke, Fifth Summ. 1: 19, 25, 30, 34, 37, 53, 59, 65, 75, 91, 98, 120, 137, 143, 177, 204, 231, 238, 262, & 370 (1971) and 2: 651, 657, 659, 662, 663, 665, 666, 670, 672, 674--677, 680, 682, 683, 689, 690, 693, 697, 700, 703, 706, 783, & 915. 1971; Priszter, Delect. Sem. Spor. Pl. Hort. Bot. Univ. Hung. 59. 1971; Westcott, Pl. Disease Handb., ed. 3, 745. 1971; Moldenke, Phytologia 22: 314 & 497 (1972) and 23: 221. 1972; D. Burpee, Burpee Seeds 1972: 1, 56, & 57, pl. 3177 & 4345. 1972; W. J. Park, Park's Flower Book 1972: 87. 1972.

Additional & emended illustrations: E. Twining, Ill. Nat. Ord. Pl. 2: 104, fig. 2 (as V. chamaedrifolia) [in color]. 1855; Noack, Biol. Zentralbl. 57: 386, fig. 14. 1937; Fischer & Harshberger, Flower Fam. Alb. 87. 1941; Bodger, Libr. Hort. Illustr. Electros of Fls. 61 & 95, pl. 54g, 441e, 573c [in color], 956a, 1137f, & 3018f [in color]. 1952; Mauser, Samen [Zürich] 1953: 1, fig. 8053 [in color]. 1953; Withamfogg in Kiaer & Hancke, Gard. Fls. in Colour, pr. 1, 127, fig. 487--489 & 491 [in color]. 1959; Buia, Fl. Mic. Illustr. Rep. Pop. Rom. [50], pl. 16. 1961; S. R. & R. S. Fujimoto, U. S. Pl. Patent 2271. 1963; E. L. D. Seymour, Wise Gard. Encycl., ed. 6, pl. 59 [in color] (1963) and ed. 7, pl. 59 [in color]. 1964; Bardi, Trop. Gard. Burle Marx 123, pl. 177. 1964; Fugii, U. S. Pl. Patent 2404 [in color] (1964) and 2537 [in color]. 1965; Heimans, Heinsius, & Thijsee, Geillustr. Fl. Nederl. 908 (as V. chamaedrifolia). 1965; Yotaro, Gard. Pl. World 1: pl. 66, fig. 1 [in color]. 1965; J. G. Barton in Novák, Pict. Encycl. Pl. & Fls. 403, fig. 801. 1966; Greensill, Trop. Gardening 98. 1966; Roos, Natl. Geogr. 133: 726 & 732 [in color]. 1968; Faroy Inc. Houston Tex. Card 25-89 [in color]. 1968; Verbena Snow White, Northrop King Seeds 526 [in color]. 1968; Withamfogg in Kiaer & Hancke, Gard. Fls. in Colour, pr. 5, 127, fig. 487--489 & 491 [in color]. 1968; Hay & Syngé, Dict. Gard. Pl. 49, pl. 392 [in color]. 1969; Shumway, Ann. Cat. 99: 4. 1969; Bright of America, Summersville, W. Va., 25.GC.70 Petunias & Verbenas [in color]. 1970; Graf, Exot. Pl. Man., ed. 1, 411. 1970; G. W. Park Seed Co., Park's Flower Book 1971: 75 [in color]. 1971; D. Burpee, Burpee Seeds 1972: 1 [in color], 5, 6, & 57, pl. 3177 [in color] & 4345 [in color]. 1972; W. J. Park, Park's Flower Book 1972: 87 [in color]. 1972.

The Tischler (1927) reference in the bibliography above is cited by Bolkhovskikh and his associates (1969) as "Tischler,

Pflanzl. Chrom....."

Pennington tells us that in Chihuahua, Mexico, this entire plant is decocted into a potion taken for "dolor del estómago" (stomache-ache). Blank (1947) reports that investigations have shown that pelargonidin derivatives are sometimes dominant and sometimes recessive to delphinidin derivatives in this plant; also, monosides are sometimes dominant and sometimes recessive to dimonosides. Mixtures of anthocyanins occur due to incomplete dominance or to modifying factors. Geissman & Hinreiner (1952) report the presence in this plant of a naturally-occurring anthocyanin called delphin, which is a 3,5-diglucoside of delphinidin. Farnsworth and his associates (1969) record the isolation by Scott-Moncreeff & Sturgess (1940) of delphinidin-3,5-diglycoside, delphinidin-3-monoglycoside, and glucose in the flowers of xV. hybrida. Ledbetter and his associates (1959) report that "Verbena sp. var. L. A." is one of 32 species and varieties of plants susceptible on exposure to ozone at concentrations of 0.1 to 1.0 ppm. in a circulating stream of washed air. Very young leaves with no functional stomata were resistant to ozone, but others spotted necrotically.

Thornberry (1966) and Westcott (1971) record the following disease-causing organisms as attacking this plant: Botrytis cinerea Pers. (a flower blight, in Massachusetts), Erysiphe cichoracearum P. DC. (a powdery mildew, general), Macrophomina phaseoli (a charcoal rot, Oklahoma), Phymatotrichum omnivorum (Shear) Dug. (a root rot, Texas), Rhizoctonia solani Kuehn (a root rot, New York), Thielaviopsis basicola (a root rot, Pennsylvania), Meloidogyne sp. (a root rot nematode, Maryland), Sclerotium bataticola Taub. (a charcoal stem rot, Oklahoma), Sphaerotheca humuli (P. DC.) Burr. (a powdery mildew, Puerto Rico), and Heterodera marioni (Cornu) Goodey (a root knot nematode, Maryland).

According to Hirata (1966) the following fungi attack xV. hybrida: Erysiphe cichoracearum (in Australia, Bermuda, Sweden, and United States), E. polyphaga (in France, Germany, Italy, and Switzerland), Sphaerotheca fuliginea and S. verbenae (in Armenia, Australia, Italy, Japan, Lithuania, Puerto Rico, Romania, and United States), Microsphaera ferruginea (in Italy and Sweden), and Oidium verbenae (in Argentina, Australia, Egypt, New Zealand, Portugal, Rhodesia, South Africa, Switzerland, Tasmania, and United States), all powdery mildews.

The Bush-Browns (1965) add the oblique-banded leaf-roller to the known pests of this plant. This is a small caterpillar, banded with yellow and light-green, feeding on the foliage and flowers, rolling and webbing the leaves with silken threads. The female moth deposits her eggs in tiny masses on the foliage, where they hatch in a few weeks. The larvae are full-grown in one month, pupate within the rolled leaves, and emerge as adults several weeks later. There are normally two broods per season. Kelly (1967) reports that a blister beetle constitutes a pest of this

plant in the Rocky Mountain region.

The Nehrlings (1968) list this among their annual drought-resistant plants. Laurie, Kiplinger, & Belson (1968) aver that verbenas of this type can be sown in early March for spring sale by dealers, but better plants with more flowers can be produced by sowing the seed in early February and carrying the plants at 53° F. Picking will make compact bushy plants of the taller grandiflora types, although natural dwarf varieties are available. Tingle (1967) reports it as being cultivated in Hongkong. Thornberry (1966) notes that it is "widely grown for ornament as a summer annual in the North [of the United States] and as a winter annual in the South."

According to Mishra (1967) terminal shoot-tips of this plant were treated experimentally with colchicine at concentrations of up to 0.1 percent for 4, 8, and 16 hours. All the treated seedlings survived, although growth was temporarily retarded. They later became taller than control seedlings, had 12--23 branches as compared to only 5--8 on the controls, and produced larger and more serrated leaves. Stomatal size increased considerably in the treated plants with a corresponding decrease in number per unit of leaf-surface and the pollen-grains were significantly larger with a high sterility percentage. The treated plants remained vegetative longer, but the flowering period was also more prolonged than in the controls.

Coon (1967) notes that "The flowers are not noted for fragrance, yet there's a special kind of quiet, haunting odor to verbenas which you'll not get to know unless you grow them." Burkill (1966) says that "V. hybrida does not fruit in Malaysia, as the climate is too moist. The presumed parents are perennial, but V. hybrida must be grown as an annual from imported seed, and.....is impatient of damp and not always a success in wet weather." Ohwi (1965) records it as cultivated in Japan. Radford, Ahles, & Bell (1964) affirm that the plant is commonly cultivated in the Carolinas and rarely escaped along roadsides and in sandy alluvium in Darlington and Kershaw Counties, South Carolina, flowering there from late March to May.

Webber (1968) informs us that verbenas were introduced into England from South America in the mid-eighteenth century and then used mainly as bedding plants. Stucchi (1968) adds that the hybrid was first introduced into Italy between 1829 and 1839. Kuck & Tongg (1955) reiterate that it is very difficult to grow in tropical gardens. It has apparently escaped from cultivation and become naturalized in Paraná, Brazil, where it is now found in "Locaes umidos de varzea", according to Hatschbach. The corollas on these naturalized specimens are "violet" [Hatschbach 14769] or "rosa avermelhada" [Manfrin 4]. In Honduras the naturalized plants have "rose-red" corollas [Molina R. 14708].

Culture directions given by Northrup King (1968) are "use: cut flower, low bedding and border. Where to plant: any garden soil under full sunlight. When & how to plant: indoors: For earliest flowering, start seeds in flats, peat pots or boxes in

early spring. Cover seed 1/8 inch deep, pressing firmly into soil. Keep moist and in sunny window. When seedling [is] 2 inches tall, thin or transplant. When weather [is] warm, transplant into garden spacing about 1 foot apart. Water well and protect from sun a few days. Outdoors: Seed can be sown as soon as weather [is] warm outdoors covering about 1/4 inch deep. Firm soil well over seeds. Later thin plants to 1 foot apart....germination [is] slow on Verbena, usually 3--4 weeks so allow ample time for sprouts to appear." Park (1971) calls the plants "Deliciously fragrant - Always in bloom. Brilliantly colored blooms, fine plants for beds, borders, edgings and cuttings. Seed started outside in May will bloom from midsummer until frost; started early inside, June until frost. Fine for covering the bare spot left by early spring bulbs or ground cover among summer or fall bulbs. Easily grown." Priszter (1971) offers seed as his no. 1669.

The following horticultural strains of xV. hybrida are listed in recent horticultural literature and are recorded here because they are either new or their descriptions differ somewhat from the descriptions previously recorded by me:

- Amethyst (Park) -- "that lovely sought-after mid-blue, very dwarf 8--12-inch compact plants", Sparkle type; (Burpee) -- "a dwarf Sparkle of low cushionlike plants covered with lavender-blue fls. ideal for low-growing edges, borders, and beds."
- Blaze (Hay & Synge) -- dwarf, 9-inch plants, with brilliant scarlet flowers; (P) All-American Selection winner, with large, bold, bright, solid, scarlet flower-heads 3 inches across; (Burpee) -- "a Dwarf Sparkle of dazzling bright scarlet color".
- Bush Type Mixed (Park) -- broad flat-topped bushy plants 8--10 inches tall, 12--15 inches across, flower-heads almost touching each other entirely covering the plant.
- Candidissima (Withamfogg) -- a dwarf hybrid, 10 inches tall, with white flowers.
- Chiquita -- this is V. tenera var. maonetti Regel, which see.
- Compliment (Park) -- Bush type, with salmon-orange flowers, each with a yellow eye.
- Crystal (Park) -- Sparkle type, with white flowers.
- Dannebrog (Withamfogg) -- plants 10--16 inches tall, blooming early, the flowers light-red with white centers.
- Dazzle (Park) -- Sparkle type, with red flowers.
- Defiance -- see under xV. corrupta Moldenke.
- Delight (Park) -- Sparkle type, with coral flowers.
- Dwarf Sparkle -- free-blooming compact spreading strain forming a floral carpet all season, 6 inches tall (Burpee).
- Firefly (Greensill) -- bright scarlet flowers, meritorious, seed not easy to harvest, shake seed-heads into a bag daily when the sun is hottest.
- Firelight (Mauser, Park) -- Bush type, with red flowers.
- Giant Salmon Queen (Mauser) -- with salmon-red flowers.

- Ideal Florist Mixture (Park) -- early flowering plants weaving a carpet of color in summer gardens, only 8 inches tall but spreading to 18 inches across the ground, "the plants clothe themselves in a dazzling array of colors ranging from white to scarlet and pink to purple, each with a dash of white in the center".
- Madame Du Barry (Park) -- "an entirely new color in verbenas, brilliant purplish-red", vigorous plants 10 inches tall, "large umbels on strong stems, free-branching but distinctly compact in habit, good for bedding and cutting".
- Mammoth Royal Bouquet (Hay & Synge) -- colorful mixed strain with white Auricula eye, plants 12 inches tall.
- Multiflora Gigantea (Burpee) -- free-blooming bush type bearing large trusses of big flowers 10 inches tall. "Finest Mixed" colors include rose-pink, lavender, blue, white, violet, salmon-pink, scarlet, and red shades, many "eyed". Burpee No. 4345.
- Rainbow Mixed (Hay & Synge) -- compact, 9 inches tall, very early flowering.
- Roselight (Mauser, Park) -- Bush type, rose-colored flowers.
- Royal Blue (Withamfogg) -- 18 inches tall, with deep purple-blue flowers.
- Royal Carpet (Fugii) -- see Plant Patent description.
- Ruffled Pink (Burpee) -- a lovely deep salmon-pink with neat clusters of ruffled flowers and handsome deep-green foliage; the colorful plants are ideal for edgings, beds, ground covers, rock gardens and window-boxes, thriving even in poor soil.
- Salmon Queen (Park) -- Bush type, with salmon-pink flowers.
- Snow Carpet (Fugii) -- see Plant Patent description.
- Snow White (Mauser, Northrup, Park) -- Bush type, with compact clusters of fragrant flowers on attractive compact plants, pure glistening white flowers, plants 1 foot tall.
- Sparkle (Park) -- with scarlet flowers.
- Sparkle Mixed (Hay & Synge, Park) -- dwarf, compact, mound-shaped plants, 6--10 inches tall, free-flowering and completely covered with bloom (no open spots), the full color mixture includes warm scarlet through rose and pink to softer salmon, lavender, and white, mid-blue, purple, and bright combinations.
- Splendor (Park) -- Sparkle type, with royal purple flowers with a clear white eye.
- Verbena Candycane (Fujimoto) -- see Plant Patent description.
- Verbena Grandiflora Brightness (Bodger).
- Verbena Grandiflora Mixed (Bodger).
- Verbena Grandiflora Royale (Bodger).
- Verbena Hybrida Compacta Leuchtfunk (Mauser).

To record the selling retail price of verbena seeds in 1972, it may be mentioned here that the prices charged by Burpee (1972) for "Ruffled Pink" may be taken as typical: "No. 3660 pkt. 75 cents; 1/16 oz. \$2.25; 1/8 oz. \$4.25; 1/4 oz. \$8.00."

An additional vernacular name for these plants is "tuinverbena"

in Dutch-speaking countries. The plant has been cultivated at 2800 feet altitude in Mexico. Material has been misidentified and distributed in some herbaria under the names V. chamaedrifolia Juss., V. delticola Small, and V. teucroides Gill. & Hook.

Additional citations: MEXICO: Chihuahua: Pennington 27 (Au--264116). PERU: Lima: Camona 1590 (Rf). VENEZUELA: Mérida: López-Palacios 2212 (Z). BRAZIL: Paraná: Hatschbach 14769 (W--2564569); Manfrin 4 [Herb. Fac. Farmacia 5861] (W--2527749). CULTIVATED: Honduras: Molina R. 14708 (N). New Jersey: A. L. Moldenke s.n. [July 9, 1968] (Ps--121). New Zealand: W. R. Sykes 1046/64 (Mz--153295). Pennsylvania: H. N. Moldenke 14979 (Se--135328). MOUNTED ILLUSTRATIONS: fig. 2761 [in color] (Z); Burpee fig. 2793 [in color] (Z); Vaughan Seed Cat. fig. 5715, 5716, & 5725 [in color] (Z).

#### xVERBENA ILLICITA Moldenke

Additional & emended bibliography: J. D. Poindexter, Trans. Kans. Acad. Sci. 65: 409, 410, 415, 417, & 418. 1962; Moldenke, Phytologia 16: 94. 1968; Swink, Fl. Chicago Reg. 428. 1969; Moldenke, Fifth Summ. 1: 35--37, 41, 43, 45, 47, & 52 (1971) and 2: 673, 698, 704, 705, & 915. 1971.

Poindexter, in a note appended to Poindexter 207-21, cited below, states that pollen fertility in the plant of which this is a specimen was only 17 percent and the chromosome number was  $n = 7$ .

The color photographs taken by my son, Dr. Andrew R. Moldenke, and cited by me in a previous installment of these notes, are all of A. R. Moldenke 1275 from Calhoun County, Illinois.

Additional citations: ILLINOIS: Henderson Co.: H. N. Patterson s.n. [Oquawka, July] (Pa). KANSAS: Cherokee Co.: Poindexter 207-21 (N). MISSOURI: Saint Louis: Eggert s.n. [Prairies, 14 August 1875] (Pa).

#### VERBENA INAMOENA Briq.

Additional bibliography: Moldenke, Phytologia 13: 203. 1966; Moldenke, Fifth Summ. 1: 188 (1971) and 2: 915. 1971.

#### VERBENA INCISA Hook.

Additional synonymy: Glandularia incisa (Hook.) Troncoso ex Cabrera, Fl. Prov. Buenos Aires 5a: 135. 1965.

Additional & emended bibliography: A. Gray, Man. Bot., ed. 3, lxxvi (1862), ed. 4, pr. 1, lxxvi (1863), and ed. 4, pr. 2, lxxvi. 1864; A. Gray, Field For. & Gard. Bot., ed. 1, pr. 1, 242 (1868) and ed. 1, pr. 2, 242. 1869; A. Wood, Am. Bot. & Flor., ed. 1, pr. 1, 235 (1870), ed. 1, pr. 2, 235 (1871), ed. 1, pr. 3, 235 (1872), ed. 1, pr. 4, 235 (1873), ed. 1, pr. 5, 235 (1874), and ed. 1, pr. 6, 235. 1875; A. Gray, Field For. & Gard. Bot., ed. 1, pr. 3, 242. 1880; O. R. Willis in A. Wood, Am. Bot. & Flor., ed. 2, 235. 1889; Burkart, Excerpt. Bot. A.5: 586. 1962; Angely, Fl.

Anal. Paran., ed. 1, 571. 1965; Troncoso in Cabrera, Fl. Prov. Buenos Aires 52: 133 & 135. 1965; J. A. Clark, Card Ind. Gen. Sp. Var. issue 249. 1965; Yotaro, Gard. Pl. World 1: 131. 1965; Burkill, Dict. Econ. Prod. Malay Penins. 2: 2266. 1966; Moldenke, Phytologia 16: 188, 194, 208, & 212. 1968; Moldenke, Résumé Suppl. 16: 22 & 28. 1968; Moldenke in Menninger, Flow. Vines 338 & 339. 1970; Schnack & Rubens, Bol. Soc. Argent. Bot. 13: 205 & 206. 1970; Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1, 4: 839, map 1393. 1970; G. Taylor, Ind. Kew. Suppl. 14: 63. 1970; Moldenke, Fifth Summ. 1: 30, 177, 184, 188, 190, 201, & 371 (1971) and 2: 521, 652, 657, 662, 663, 670, 677, 683, 700, 703, 783, & 915. 1971; Moldenke, Phytologia 22: 471 & 491 (1972) and 23: 239. 1972.

Recent collectors have found this plant growing in high fertile campos. According to Religa, it is found abundantly in sunny, sandy, semitropical areas in Paraguay. Troncoso (1965) gives its overall distribution as "Brasil austral, Uruguay y litoral argentino. Barrancas del Paraná" and cites Boelcke 4968, Burkart 12764, and Nicora 3541 from Buenos Aires, Argentina, deposited in the San Isidro herbarium. Schnack & Rubens (1970) record it from Buenos Aires, Corrientes, Entre Ríos, and Santa Fé provinces.

Krapovickas is of the opinion that the natural hybrid between this species and V. tenuisecta Briq. is V. calliantha Briq., which he says that he found growing very sparingly among large numbers of the two supposed parental species and which he says fails to produce fertile seed. I have been regarding xV. trinitensis Moldenke as the natural hybrid between these two species.

The corollas of V. incisa are described as having been "red" on Aguilar 55, Herrera 322, T. Rojas 322, and Terribile 871 & 882. Material has been misidentified and distributed in some herbaria under the name Glandularia peruviana (L.) Small.

Additional citations: BRAZIL: Rio Grande do Sul: H. M. Filho 353 (W--2483827). PARAGUAY: Religa s.n. [June 30, 1966] (Ws, Ws); R. Rojas 358a (Ws); Woolston 731 (N), 1353 (N). ARGENTINA: Buenos Aires: Fabris 4958 (N). Catamarca: Rodriguez V. 907 (Se--130299). Chaco: Aguilar 55 (S), 1056 (N), 1316 (N); Buratovich 72 (N), 167 (N); Malvarez 1133 (N); T. Rojas 2111 [Herb. Inst. Miguel Lillo 107893] (N). Córdoba: Terribile 871 (N), 882 (N). Corrientes: Malvarez 1152 (N). Formosa: Montes 2816 (N); I. Morel 2652 (N), 2694 (N), 2896 (N), 3113 (N), 3521 (N), 3566 (N), 3604 (N), 3624 (N), 3671 (N), 3705 (N), 3825 (N), 3844 (N), 3883 (N), 4112 (N), 4677 (N), 4869 (N), 5149 (N), 5317 (N), 5646 (N), 5751 (N), 5853 (N), 5925 (N), 6136 (N), 6319 (N), 6433 (N), s.n. [22-X-1948] (N); Pierotti 4123 (Se--130298), 6542 (N). Misiones: Montes 14662 (Ac, N, Rf); G. J. Schwarz 4717 (N). Santa Fé: Alvarez 987 (N). Tucumán: Herrera 322 (N); Olea 278 (N); Rocha 3683 (S).

VERBENA INCISA f. ALBIFLORA Osten & Moldenke

Additional bibliography: Moldenke, Phytologia 10: 112. 1964;

Moldenke, Fifth Summ. 1: 201 (1971) and 2: 677 & 915. 1971.

xVERBENA INHONESTA Moldenke

Additional bibliography: Moldenke, *Phytologia* 11: 468. 1965; Moldenke, Fifth Summ. 1: 371 (1971) and 2: 679, 705, & 915. 1971.

VERBENA INTEGRIFOLIA Sessé & Moc.

Additional & emended bibliography: Lewis & Oliv., *Am. Journ. Bot.* 48: [639]. 1961; Hocking, *Excerpt. Bot. A.* 6: 91. 1963; Moldenke, *Biol. Abstr.* 49: 4697 (1968) and 49 (10): B.A.S.I.C. S.71 & S.184. 1968; Moldenke, *Phytologia* 16: 188. 1968; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.* 717. 1969; Moldenke, Fifth Summ. 1: 76 (1971) and 2: 645, 678, & 915. 1971.

VERBENA INTEGRIFOLIA f. ALBIFLORA Moldenke

Bibliography: Moldenke, *Résumé Suppl.* 15: 3. 1967; Moldenke, *Biol. Abstr.* 49: 4697. 1968; Anon., *Biol. Abstr.* 49 (10): B.A.S.I.C. S.184. 1968; Moldenke, *Phytologia* 16: 95. 1968; Moldenke, Fifth Summ. 1: 76 (1971) and 2: 915. 1971.

xVERBENA INTERCEDENS Briq.

Additional bibliography: Moldenke, *Phytologia* 14: 286. 1967; Moldenke, Fifth Summ. 1: 177, 188, 190, 201, & 371 (1971) and 2: 655, 688, & 915. 1971.

Additional citations: PARAGUAY: Woolston 785 (Go, N).

VERBENA INTERMEDIA Gill. & Hook.

Additional & emended bibliography: Reiche & Phil., *Fl. Chil.* 5: 295. 1910; Cabrera, *Man. Fl. Alred. Buenos Aires* 295 & 396, fig. 148 a--e. 1953; Darlington & Wylie, *Chrom. Atl.*, pr. 1, 323. 1956; Schnack, Fehleisen, & Cocucci, *Revist. Fac. Agron. La Plata* 35: [47] & [54], fig. 3. 1959; Darlington & Wylie, *Chrom. Atl.*, pr. 2, 323. 1961; Martínez-Crovetto, *Bonplandia* 1: 194 & 203. 1963; Troncoso in Cabrera, *Fl. Prov. Buenos Aires* 5: 127--130, fig. 45 E--G. 1965; Huynh, *Denkschr. Schweiz. Naturforsch. Gesel. [Mém. Soc. Helv. Sci. Nat.]* 85: 100. 1965; Martínez-Crovetto, *Bonplandia* 2: 39, 52, 53, 59, & 70 (1965) and 2: 131. 1967; Moldenke, *Résumé Suppl.* 16: 28. 1968; Moldenke, *Phytologia* 16: 95 & 184. 1968; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.* 717. 1969; Moldenke, Fifth Summ. 1: 177, 190, 201, & 371 (1971) and 2: 654, 655, 661, 663, 664, 672, 678, 693, 699, 700, & 915--916. 1971; Moldenke, *Phytologia* 22: 474. 1972.

Additional illustrations: Cabrera, *Man. Fl. Alred. Buenos Aires* 396, fig. 148 a--e. 1953; Schnack, Fehleisen, & Cocucci, *Revist. Fac. Agron. La Plata* 35: [54], fig. 3. 1959; Troncoso in Cabrera, *Fl. Prov. Buenos Aires* 130, fig. 45 E--G. 1965.

Recent collectors have found this plant growing on campos and report the vernacular name "verbena". It has been collected in fruit in April and December (in addition to the months previously reported by me). The corollas are described as "violet" on Burkart 19557, "blue" on Montes 14860 and A. G. Schulz 5842, and "lilac" on Krapovickas, Cristóbal, Marufiak, Pire, & Tressens



15319. Troncoso (1965) gives its overall distribution as "Sur del Brasil, Uruguay, NE. y centro de la Argentina. Abunda en la pradera primitiva, al borde de arroyos, vías férreas y en los valles de las sierras del S. de la Provincia [Buenos Aires]". She cites Cabrera 5630 and Hicken 475 & s.n. [Herb. San Isidro 3438] from Buenos Aires. Schnack and his associates (1959) report that this plant is apomictic in its natural form of reproduction.

Additional citations: URUGUAY: L. H. Bailey B.765 (Se--113022); Rosengurtt Gurvich B.765 (W--2562150); Rosengurtt Gurvich & Gal-linal 6018 (Se--129344). ARGENTINA: Corrientes: Burkart 19557 (W--2567974); Krapovickas & Cristóbal 16302 (Rf); Tressens & Albizzatri 24 (Rf). La Pampa: Fortuna 13 (N), 30 (N); A. G. Schulz 5842 (N). Mendoza: Lourteig 852 (N). Misiones: Krapovickas, Cristóbal, Maruñak, Pire, & Tressens 15319 (Rf); J. E. Montes 14866 (Au--270806, N, Rf, W--2556116). San Luis: Varela 692 (N).

VERBENA INTERMEDIA f. ALBIFLORA Moldenke

Additional bibliography: Moldenke, *Phytologia* 9: 384. 1963; Moldenke, *Fifth Summ.* 1: 201 (1971) and 2: 916. 1971.

VERBENA INTERMEDIA f. GLABRESCENS Hauman-Merck

Additional bibliography: Moldenke, *Phytologia* 9: 384. 1963; Moldenke, *Fifth Summ.* 1: 201 (1971) and 2: 916. 1971.

VERBENA INTERMEDIA var. LANUGINOSA Moldenke

Additional bibliography: Moldenke, *Phytologia* 9: 384--385. 1963; Moldenke, *Fifth Summ.* 1: 201 (1971) and 2: 916. 1971.

VERBENA JORDANENSIS Moldenke

Additional bibliography: Angely, *Fl. Anal. Paran.*, ed. 1, 572. 1965; Moldenke, *Phytologia* 16: 95. 1968; Angely, *Fl. Anal. Fito-geogr. Est. S. Paulo*, ed. 1, 4: 839 & xix, map 1393. 1970; Moldenke, *Fifth Summ.* 1: 177 (1971) and 2: 692 & 916. 1971.

Hatschbach has collected this species on rocky grassy campos. The corollas are described as "violet" on Hatschbach 22833, "lilac" on Hatschbach 22419, and "dark lilac" on Hatschbach 14883.

Additional citations: BRAZIL: Paraná: Hatschbach 14883 (W--2564554), 22833 (N, Rf), 33419 (Ac). Santa Catarina: Smith & Reitz 12479 (N).

xVERBENA KONDAI Moldenke

Additional bibliography: Moldenke, *Phytologia* 11: 468. 1965; Moldenke, *Fifth Summ.* 1: 371 (1971) and 2: 692, 700, & 916. 1971.

VERBENA KUNTZEANA Moldenke

Additional bibliography: Angely, *Fl. Anal. Paran.*, ed. 1, 572. 1965; Moldenke, *Phytologia* 11: 468. 1965; Moldenke, *Fifth Summ.* 1: 177, 188, & 201 (1971) and 2: 683 & 916. 1971.

## VERBENA LACINIATA (L.) Briq.

Additional synonymy: Verbena erinoideas Lam. apud Baez, Anal. Asoc. Estud. Mus. Pop. Paraná 1920: 37, sphalm. 1920. Verbena lacinata (L.) Briq. ex Moldenke, Résumé Suppl. 3: 39, in syn. 1962. Verbena laciniata (Lam.) Briq. ex Moldenke, Résumé Suppl. 3: 39, in syn. 1962. Veraena erinoides Lam. ex Tawada, Biol. Mag. Okinawa 4 (6): 36, sphalm. 1967. Verbena laciniata (H.B.K.) Briq. ex Moldenke, Résumé Suppl. 16: 28, in syn. 1968. Erimus laciniatus L. apud Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1, 4: 839 & vii, sphalm. 1970.

Additional & emended bibliography: Balbis, Cat. Stirp. Hort. Acad. Taur. 80. 1813; Pers., Sp. Pl. 3: 346. 1819; Steud., Nom. Bot. Phan., ed. 1, 873. 1821; Jan, Elench. Pl. 1. 1831; A. Gray, Field For. & Gard. Bot., ed. 1, pr. 1, 242 (1868) and ed. 1, pr. 2, 242. 1869; A. Wood, Am. Bot. & Flor., ed. 1, pr. 1, 235 (1870), ed. 1, pr. 2, 235 (1871), ed. 1, pr. 3, 235 (1872), ed. 1, pr. 4, 235 (1873), ed. 1, pr. 5, 235 (1874), and ed. 1, pr. 6, 235. 1875; A. Gray, Field For. & Gard. Bot., ed. 1, pr. 3, 242. 1880; O. R. Willis in A. Wood, Am. Bot. & Flor., ed. 2, 235. 1889; L. H. Bailey in A. Gray, Field For. & Gard. Bot., ed. 2, 341. 1895; Briq. in Chod. & Wilczek, Bull. Herb. Boiss., sér. 2, 2: 544. 1902; T. Peckolt, Bericht. Deutsch. Pharm. Gesell. 14: 466. 1904; Reiche & Phil., Fl. Chil. 5: 287, 289, & 294--295. 1910; Baez, Anal. Asoc. Estud. Mus. Pop. Paraná 1920: 37. 1920; Noack, Biol. Zentralbl. 57: [383], 384, & 387, fig. 17. 1937; Baez, Mus. Entre Ríos Cart. Herb. Paran. 43. 1938; Fischer & Harshberger, Flower Fam. Alb. 86. 1941; J. A. Clark, Card Ind. Gen. Sp. Var. issue 133. 1944; E. L. D. Seymour, New Gard. Encycl., ed. 3, 1279 (1944), ed. 4, 1279 (1946), and ed. 5, 1279. 1951; Kuck & Tongg, Mod. Trop. Gard. 213. 1955; Darlington & Wylie, Chrom. Atl., pr. 1, 323. 1956; Schnack, Fehleisen, & Cocucci, Revist. Argent. Agron. 24: 132, 134, & 135. 1957; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 612, 614, 619, 623--626, & 629. 1960; Darlington & Wylie, Chrom. Atl., pr. 2, 323. 1961; Harler, Gard. Plains, ed. 4, 23, 24, 29, 238, & 250. 1962; E. L. D. Seymour, Wise Gard. Encycl., ed. 6, 1279. 1963; Troncoso in Böcher, Hjerting, & Rahn, Dansk Bot. Arkiv 22 (1): 109. 1963; E. L. D. Seymour, New Gard. Encycl., ed. 6, 1279 (1963) and ed. 7, 1279. 1964; R. Good, Geogr. Flow. Pl. 218. 1964; Backer & Bakh., Fl. Jav. 2: 596. 1965; J. & L. Bush-Brown, Am. Gard. Book, ed. 4, 327. 1965; Solbrig, Castanea 30: 173. 1965; Burkill, Dict. Econ. Prod. Malay Penins. 2: 2266. 1966; Greensill, Trop. Gardening 79. 1966; Hirata, Host Range & Geogr. Distrib. Powd. Mild. 277. 1966; E. Lawrence, South. Gard., ed. 2, 115, 135, 172, & 214. 1967; Tawada, Biol. Mag. Okinawa [Okinawa Seibutsugakkai] 4 (6): 36--37. 1967; Moldenke, Phytologia 16: 188 & 207. 1968; Moldenke, Résumé Suppl. 16: 28. 1968; Solbrig, Passani, & Glass, Am. Journ. Bot. 55: 1239. 1968; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 715--717. 1969; R. F. V. Cooper in Pastore, Bol. Soc. Argent. Hort. 157: 123--125. 1969; Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1, 4: 839,

vii, & xix, map 1393. 1970; E. L. D. Seymour, New Gard. Encycl., ed. 8, 1279. 1970; Moldenke, Fifth Summ. 1: 137, 143, 178, 184, 190, 193, 201, & 371 (1971) and 2: 492, 521, 522, 569, 664, 667, 668, 671, 678, 684, 686, 691, 696, & 916. 1971; Moldenke, Phytologia 23: 222, 223, & 231. 1972.

Additional illustrations: Noack, Biol. Zentralbl. 57: 387, fig. 17. 1937.

Sparre found this plant growing on dry slopes in Ecuador, while Fosberg refers to it as "prostrate, common in grassy places on top of low hill grazed by goats". The corollas are described as having been "violet" on Angulo & López 1346, "pale-violet" on Asplund 20147, "lavender" on Fosberg 27645, and "light to rather dark reddish-violet" on Asplund 20463, while Lourteig says "flor amarilla violacea muy aromática".

Macbride (1960) does not attempt to separate V. tenuisecta Briq., V. dissecta Willd., and V. laciniata (L.) Briq. in his key, lumping them all together in the line reading "Leaves mostly or all larger" [than 1 cm.]. Actually, a casual examination of the calyx or fruiting-calyx of each of these taxa under a hand-lens reveals quite distinct pubescence characters for separating them with comparative ease. He comments about V. laciniata: "Type from Peru by Feuillée. Stems wiry, prostrate, forming loose mats to a meter or more wide, the odorless, clear, mauve to violet flowers in flattened heads to 5 cm. across (Balls); as interpreted, leaves trifid or much divided, the Linnaean plant was said to have scarlet flowers (Hooker); red-violet (Schauer)." He cites the following specimens from Peru: Cuzco: Herrera 18, 3442, & 3450, Hicken s.n. [Sicuaní], Pennell 13677, Vargas 241. Huánuco: Macbride 1260. La Libertad: West 8115. Lima: Ferreira 6502, Killip & Smith 21754, Macbride 678, Raimondi 10703. Briquet (1902) cites Wilczek 44, while Troncoso (1963) cites Hicken 65.

Hirata (1966) records the fungus, Oidium verbenae, as infesting V. laciniata in Java, but it is not at all certain that the plant cultivated in Java and described by Backer & Bakhuizen van den Brink (1965) is really this species. I suspect that it is really V. tenuisecta Briq., as I suspect are also the plants referred to as V. erinoides by Lawrence (1967) and by Tawada (1967), while that discussed by Harler (1962) as "white verbena" and "moss verbena" is almost certainly V. tenuisecta var. alba Moldenke. It should be noted, in passing, that Tawada's paper is sometimes cited as "1968", but the first page of the issue is plainly dated December 25, 1967, as is also the first page of Tawada's article. He records the vernacular name "karakusa-baabena", but, again, it is most probable that this applies to V. tenuisecta rather than to the true V. laciniata.

Peckolt (1904) records a plant which he calls V. erinoides Lam. as being cultivated in Rio de Janeiro under the name "chá do Brasil", which he translates as "brasilianischer Tee". He describes the plant as a "Niederliegende Pflanze mit an der Basis

keilförmigen, in den Blattstiel verlaufenden, dreiteilig-fieder-spaltigen Blättern. Blüten lilafarben. Die Infusion gilt beim Volke als menstuations- und lochienbeförderndes Mittel. Schwach geröstet, wird sie von den Familien der Arbeiter als Ersatz des indischen Tees benutzt." It seems most probable that this, also, as with most of the many other references in literature to "V. erinoides Lam.", refers to V. tenuisecta Briq., rather than to V. laciniata.

The Pfister 2177, distributed as V. laciniata, is actually V. berterii (Meisn.) Schau., while Soukup 4960 is V. occulta Moldenke, Troncoso 353 is V. santiaguensis (Covas & Schnack) Moldenke, and P. O. Schallert 251 is V. tenuisecta Briq.

Additional citations: ECUADOR: Chimborazo: Asplund 20463 (N); F. R. Fosberg 27645 (Rf). Cotopaxi: Sparre 15690 (S). Tunguragua: Asplund 20147 (N). PERU: Arequipa: Vargas Calderón 19434 (Ac). La Libertad: Angulo & López 1346 (Ac). Lima: López Guillén 670 (Rf); Riccio & Chumpitáz 3748 (Rf). ARGENTINA: Mendoza: Lourteig 772 (N).

VERBENA LACINIATA var. CONTRACTA (Lindl.) Moldenke

Additional bibliography: Moldenke, Phytologia 11: 469. 1965; Moldenke, Fifth Summ. 1: 193, 201, & 371 (1971) and 2: 667, 668, 684, & 916. 1971.

VERBENA LACINIATA var. SABINI (Sweet) Moldenke

Additional bibliography: Moldenke, Phytologia 11: 469. 1965; Moldenke, Fifth Summ. 1: 371 (1971) and 2: 667, 668, 678, 684, 694, & 916. 1971.

VERBENA LAEVIS Salmon ex Hirata, Host Range & Geogr. Distrib.

Powd. Mild. 277, nom. nud. 1966.

Bibliography: Hirata, Host Range & Geogr. Distrib. Powd. Mild. 277. 1966; Moldenke, Fifth Summ. 1: 375 (1971) and 2: 916. 1971.

Nothing is known to me of this plant except that Hirata (1966) states that it is attacked by the ubiquitous fungus, Erysiphe cichoracearum P. DC., giving "Salmon" as authority.

VERBENA LANDBECKI R. A. Phil.

Additional & emended bibliography: Reiche & Phil., Fl. Chil. 5: 285 & 287. 1910; Moldenke, Phytologia 13: 251. 1966; Moldenke, Fifth Summ. 1: 193 (1971) and 2: 679 & 916. 1971.

VERBENA LASIOTACHYS Link

Additional & emended bibliography: Steud., Nom. Bot. Phan., ed. 1, 873 & 874. 1821; Cheymol, Bull. Soc. Chim. Biol. 19: 1647--1653. 1937; Noack, Biol. Zentralbl. 57: 384 & 386, fig. 2. 1937; Anon., Chem. Abstr. 32: 2977. 1938; Howell, Marin Fl., ed. 1, 232--233. 1949; Abrams, Illustr. Fl. Pacif. States, pr. 1, 3: 610, 611, & 616, fig. 4344. 1951; Rattenbury, Madroffio 15: 51. 1959; Ferris in Abrams & Ferris, Illustr. Fl. Pacif. States, pr. 1, 4:

651 & 730. 1960; J. H. Thomas, Fl. Santa Cruz Mtns., pr. 1, 294 & 434, fig. 192. 1961; Pusateri, Fl. Sierra Natl. Parks 104 & 105, fig. 138. 1963; Ferris in Abrams & Ferris, Illustr. Fl. Pacif. States, pr. 2, 4: 651 & 730. 1965; Hocking, Excerpt. Bot. A.9: 364. 1965; Raven, Kyhos, & Hill, Aliso 6: 113. 1965; Abrams, Illustr. Fl. Pacif. States, pr. 2, 3: 610, 611, & 616, fig. 4344. 1967; Boivin, Naturaliste Canad. 94: 642. 1967; Ornduff, Reg. Veg. 50: 86 & 123. 1967; Boughey, Mus. Syst. Bio. Univ. Calif. Irvine Res. Ser. 1: 82. 1968; J. T. Howell, Calif. Bot. Club Trans-Sierran Phyt. Exped. 1968 p. 14. 1968; Moldenke, Phytologia 16: 188 & 200. 1968; Moldenke, Résumé Suppl. 16: 1 & 28. 1968; Munz, Suppl. Calif. Fl. 101. 1968; Munz & Keck, Calif. Fl. 686--688 & 1679. 1968; J. H. Thomas, Fl. Santa Cruz Mtns., pr. 2, 294 & 434, fig. 192. 1968; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 717. 1969; Farnsworth, Blomster, Quimby, & Schermerh., Lynn Index 6: 267. 1969; H. L. Mason, Fl. Marshes Calif., pr. 2, 677 & 877. 1969; J. T. Howell, Marin Fl., ed. 2, 232--233. 1970; Moldenke, Fifth Summ. 1: 18, 64--66, 76, & 371 (1971) and 2: 672, 674, 679, 680, 691, 693, 705, & 916. 1971; Rickett, Wild Fls. U. S. 5 (2): [455], 456, & 665, pl. 152. 1971; Moldenke, Phytologia 22: 458 & 467 (1972) and 23: 226 & 228. 1972.

Additional illustrations: Noack, Biol. Zentralbl. 57: 386, fig. 2. 1937; Abrams, Illustr. Fl. Pacif. States, pr. 1, 3: 616, fig. 4344. 1951; J. H. Thomas, Fl. Santa Cruz Mtns., pr. 1, 294, fig. 192. 1961; Pusateri, Fl. Sierra Natl. Parks 104, fig. 138. 1963; Abrams, Illustr. Fl. Pacif. States, pr. 2, 3: 616, fig. 4344. 1967; J. H. Thomas, Fl. Santa Cruz Mtns., pr. 2, 294, fig. 192. 1968; Rickett, Wild Fls. U. S. 5 (2): [455], pl. 152 [in color]. 1971.

The Madroño (1959) reference cited above is sometimes credited to Solbrig, but appears to be part of a series begun by Rattenbury and not otherwise accredited since.

Recent collectors have found V. lasiostachys growing on open hills and on the banks of streams. Howell (1949) says that it is rather rare in clay soil of open grassy places or the edge of brush in Marin County, California. Boughey (1968) refers to it as "occasional" in wet places in Orange County, while Thomas (1968) reports it from dry ground of disturbed areas, creek-bottoms, roadsides, and along the edge of brushy vegetation in the Santa Cruz Mountains, blooming there from May to September. He separates it from V. robusta Greene as follows:

V. lasiostachys -- "Adaxial leaf-surfaces not scabrous; spikes

loosely flowered in fruit."

V. robusta -- "Adaxial leaf-surfaces scabrous; spikes densely flowered in fruit."

A. R. Moldenke 3396 is a very abnormal collection with foliaceous bracts in the young flower-spikes; according to the collector it appeared in the Stanford University greenhouse after insecticide sprays had been used therein -- the plants were normal before the spraying and shoots which developed after the spraying had been completed were also normal.

Raven, Kyhos, & Hill (1965) report the chromosome number for V. lasiostachys as " $2n = 7$ " based on Raven 75411 from Los Angeles County, California, II and deposited in the herbarium of the University of California at Los Angeles. Munz (1968) quotes this as " $2n = 7$  pairs". Verbenaloside is reported from this species by Cheymol (1937). Boughey (1968) cites Booth 1171 from Orange County, California.

Boivin (1967) is of the opinion that Née 111, preserved in the Madrid herbarium and labeled as having been collected on Nootka Island, is actually mis-labeled and did not originate on that island, where, he maintains, this species of vervain is unknown. This assumption is very possible, since numerous others of Née's collections have been shown to be accompanied by erroneous locality data.

My son, Dr. Andrew R. Moldenke, reports that during the past several years' field work in California he has observed the following insects visiting the flowers of Verbena lasiostachys: Ashmeadiella cactorum basalis, A. californica, Bombus vosnesenskii, Ceratina acantha, C. michneri, C. nanula, C. pacifica, C. sequoiae, Chelostoma cockerellii, Chelostomopsis rubifloris, Epeolus americanus, Eulonchus marginatus, Geron sp., Heriades occidentalis, Hesperapis regularis, Hippodamia convergens, Hoplitis producta gracilis, Hylaeus cressoni, Lepidanthrax lauta, Megachile brevis onobrychia, M. gentilis, Melissodes lupina, Phycioides campestris, and Polites sabuleti. Of these, Ashmeadiella, Chelostoma, Chelostomopsis, Heriades, Hoplitis, and Megachile are megachilid bees, Bombus is a bumblebee, Ceratina is a carpenter bee, Epeolus and Melissodes are anthophorid bees, Eulonchus is a cyrtid fly, Geron and Lepidanthrax are bombyliid flies, Hesperapis is a melittid bee, Hippodamia is a lady beetle, Hylaeus is a colletid bee, and Phycioides and Polites are butterflies.

The McCulloch 2063c and Purer 5438, distributed as V. lasiostachys, are actually V. abramsi Moldenke, González Quintero 2868 is in part V. elegans H.B.K. and in part V. elegans var. asperata Perry, Cusick 4812, Getty 1, Hoover 9570, R. E. Nelson 158, Purer 5698 & 6755, and J. P. Tracy 18090 are V. lasiostachys var. septentrionalis Moldenke, and Cleveland s.n. [Sweetwater Valley] is V. robusta Greene.

Additional citations: CALIFORNIA: Los Angeles Co.: S. F. Blake 451 [Herb. Blake 1403] (Ld), 523 [Herb. Blake 1478] (Ld), 704 [Herb. Blake 1665] (Ld); Herb. James s.n. [1879] (W--2606745). Monterey Co.: L. W. Reinecke s.n. [September 5, 1937] (Se--144709); Youngberg s.n. [July 1938] (Se--136374). San Bernardino Co.: Munz 12313 (Se--129685). San Diego Co.: Gander 9471 (Sd--28844); I. L. Wiggins 2614 (Sd--48715, Se--186887). San Mateo Co.: Cummings & McCallum 3726 (Sd--38891). Ventura Co.: Purer

6703 (Sd--38892). County undetermined: M. Armstrong s.n. (Mi).  
CULTIVATED: California: A. R. Moldenke 3396 (Ac, Z).

VERBENA LASIOSTACHYS f. ALBIFLORA Moldenke

Additional bibliography: Moldenke, *Phytologia* 13: 251. 1966;  
Moldenke, *Fifth Summ.* 1: 65 (1971) and 2: 916. 1971.

VERBENA LASIOSTACHYS var. SCABRIDA Moldenke

Additional bibliography: Abrams, *Illustr. Fl. Pacif. States*,  
pr. 1, 3: 611. 1951; Ferris in Abrams & Ferris, *Illustr. Fl.*  
*Pacif. States*, pr. 1, 4: 730 (1960) and pr. 2, 4: 730. 1965; A-  
brams, *Illustr. Fl. Pacif. States*, pr. 2, 3: 611. 1967; Moldenke,  
*Phytologia* 16: 96. 1968; Munz & Keck, *Calif. Fl.* 688 & 1679.  
1968; Moldenke, *Fifth Summ.* 1: 64 & 65 (1971) and 2: 679 & 916.  
1971; Moldenke, *Phytologia* 22: 459. 1972.

Abrams (1951) reduces this taxon to synonymy under V. robusta  
Greene, but it seems more probable to me that it may represent a  
natural hybrid with that species.

VERBENA LASIOSTACHYS var. SEPTENTRIONALIS Moldenke

Additional bibliography: Abrams, *Illustr. Fl. Pacif. States*,  
pr. 1, 3: 611. 1951; Ferris in Abrams & Ferris, *Illustr. Fl. Pac-*  
*if. States*, pr. 1, 4: 730 (1960) and pr. 2, 4: 730. 1965; Abrams,  
*Illustr. Fl. Pacif. States*, pr. 2, 3: 611. 1967; Moldenke, *Phy-*  
*tologia* 16: 96, 97, 188, & 200. 1968; Munz & Keck, *Calif. Fl.* 688  
& 1679. 1968; Moldenke, *Fifth Summ.* 1: 64, 66, & 371 (1971) and  
2: 656, 679, 685, 686, 691, & 916. 1971; Moldenke, *Phytologia* 22:  
458. 1972.

Recent collectors describe this plant as 8--18 inches tall,  
growing on hillsides or in dry open ground with Hypericum perfor-  
atum and Aira caryophyllea. The corollas are described as having  
been "purple" on Dennis & Dennis 2255. Andrew R. Moldenke and I  
saw this plant growing and flowering in Tehama County, California,  
in July, 1968. A duplicate of the Cusick 4812 collection, cited  
below, was identified previously and cited by me in an earlier in-  
stallment of these notes as typical V. lasiostachys Link. It  
should be re-examined.

Additional citations: OREGON: Jackson Co.: Cusick 4812 (Se--  
147070); Dennis & Dennis 2255 (N). Josephine Co.: Steward & Mat-  
thews 7188 (Se--202455). CALIFORNIA: Glenn Co.: R. E. Nelson 159  
(Se--161066). Humboldt Co.: J. P. Tracy 18090 (Se--203785). Kern  
Co.: Jerabek s.n. [Hockett Place, July 1945] (Sd--36713). Mendoc-  
cino Co.: J. P. Tracy 5059 (Se--203766). San Diego Co.: Getty 1  
(Sd--50407); Purer 5698 (Sd--38889). San Luis Obispo Co.: Hoover  
9570 (Au--297791). Santa Barbara Co.: Tucker 1983 (Se--157877).  
Trinity Co.: Moldenke & Moldenke 24848 (Ac, Rf). Ventura Co.:  
Purer 6755 (Sd--38893).

xVERBENA LECOCQI Moldenke

Additional bibliography: Moldenke, *Phytologia* 9: 473. 1964; Mol-

denke, Fifth Summ. 1: 371 (1971) and 2: 674, 679, & 916. 1971.

VERBENA LILACINA Greene

Additional bibliography: Moldenke, Phytologia 16: 97. 1968; Moldenke, Fifth Summ. 1: 76 & 78 (1971) and 2: 672 & 916. 1971.

Recent collectors describe this plant as a small suffrutescent perennial or a bush 2 feet tall, growing on salty flats or on the open slopes of peaks, occasionally on arroyo banks in canyons. Harbison found it to be "very abundant", but Moran saw only "a few". It has been collected in anthesis in February and in June, and in fruit in June (in addition to the months previously reported by me). The corollas are described as "pinkish-lavender" on Wiggins & Thomas 187 and "blue or light-blue" on C. H. Muller 10784. Material has been misidentified and distributed in some herbaria under the name V. gooddingii var. gooddingii Briq.

Additional citations: MEXICO: Baja California: C. F. Harbison s.n. [October 18, 1956] (Sd--46245); R. V. Moran 8195 (Sd--54632); Wiggins & Thomas 187 (W--2521929). MEXICAN OCEANIC ISLANDS: Cedros: Haines & Hale s.n. [9 March 1939] (Sd--45253); R. V. Moran 10669 (Sd--54043), 10698 (Sd--54041), 15162 (Sd--67635); C. H. Muller 10784 (Sd--51504).

VERBENA LILLOANA Moldenke

Additional bibliography: Moldenke, Phytologia 9: 474--475. 1964; Moldenke, Fifth Summ. 1: 201 (1971) and 2: 916. 1971.

The corollas on Olea 66 are described as having been "blue". The species has been collected in anthesis in July and in fruit in May, July, and December (in addition to the months previously reported by me).

Additional citations: ARGENTINA: Jujuy: Reales 617 (N), 631 (N). Tucumán: Olea 66 (N); F. Ortiz s.n. [30/5/45] (N).

VERBENA LINDBERGI Moldenke

Additional bibliography: Moldenke, Phytologia 9: 475--476. 1964; Moldenke, Fifth Summ. 1: 178 (1971) and 2: 916. 1971.

VERBENA LINDMANII Briq.

Additional bibliography: Angely, Fl. Anal. Paran., ed. 1, 572. 1965; Moldenke, Phytologia 16: 97. 1968; Moldenke, Fifth Summ. 1: 178 & 201 (1971) and 2: 680 & 916. 1971.

The corollas are described as "violet" on G. J. Schwarz 1078.

Additional citations: ARGENTINA: Misiones: G. J. Schwarz 1078 (N).

VERBENA LIPOZYGIODES Walp.

Additional bibliography: Reiche & Phil., Fl. Chil. 5: 289 & 293. 1910; Moldenke, Phytologia 14: 287. 1967; Moldenke, Fifth Summ. 1: 193 (1971) and 2: 680 & 916. 1971.

VERBENA LITORALIS H.B.K.

Additional & emended synonymy: Verbena litoralis Humb. & Bonpl.



ex Steud., Nom. Bot. Phan., ed. 1, 873. 1821. Verbena littoralis H.B.K. apud Walp., Repert. Bot. Syst. 4: 20, in syn. 1845; Hook. f., Trans. Linn. Soc. Lond. Bot. 20: 195. 1847. Verbena bonariensis sensu H. Mann, sensu Hillebr., sensu Heller, sensu Forbes, sensu Rechinger, sensu Frear, and sensu St. John & Hosaka apud Degener, Fl. Hawaii. 315: Verbena: Litoralis, in syn. 1960 [not V. bonariensis Dill., 1938, nor L., 1753, nor Rendle, 1904, nor Schau., 1960, nor Vell., 1959]. Verbena nudiflora "Nutt. ex Turcz." ex Moldenke, Résumé Suppl. 18: 14, in syn. 1969.

Additional & emended bibliography: Steud., Nom. Bot. Phan., ed. 1, 873. 1821; Speg., Anal. Soc. Ci. Argent. 9: 174. 1880; Briq. in Chod. & Wilczek, Bull. Herb. Boiss., sér. 2, 2: 543. 1902; T. Peckolt, Bericht. Deutsch. Pharm. Gesell. 14: 466. 1904; Speg., Anal. Mus. Nac. Buenos Aires 19: 323. 1909; Reiche & Phil., Fl. Chil. 5: 283. 1910; Sacc. & Trott, Syll. Fung. 21: 775. 1912; Speg., Rev. Argent. Bot. 1: 95 & 102. 1925; H. S. Jacks., Mycologia 24: 62. 1932; Cheymol, Bull. Soc. Chim. Biol. 19: 1647—1653. 1937; Noack, Biol. Zentralbl. 57: 384 & 386, fig. 10. 1937; Anon., Chem. Abstr. 32: 2977. 1938; Baez, Mus. Entre Ríos Cart. Herb. Paran. 43. 1938; Abrams, Illustr. Fl. Pacif. States, pr. 1, 3: 610. 1951; Cabrera, Man. Fl. Alred. Buenos Aires 395 & 397. 1953; Darlington & Wylie, Chrom. Atl., pr. 1, 323. 1956; Cuatrecasas, Revist. Acad. Colomb. Cienc. 10: 259. 1958; Schnack, Fehleisen, & Cocucci, Revist. Fac. Agron. La Plata 35: 49, [54], & 55, fig. 3. 1959; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 613, 615, 617, 621, 624, & 628. 1960; Ferris in Abrams & Ferris, Illustr. Fl. Pacif. States, pr. 1, 4: 730. 1960; Darlington & Wylie, Chrom. Atl., pr. 2, 323. 1961; Martínez-Crovetto, Bonplandia 1: 112 & 132. 1962; Troncoso in Böcher, Hjerting, & Rahn, Dansk Bot. Arkiv 22 (1): 109. 1963; Angely, Fl. Anal. Paran., ed. 1, 572. 1965; Huynh, Denkschr. Schweiz. Naturforsch. Gesel. [Mém. Soc. Helv. Sci. Nat.] 85: 100. 1965; Ferris in Abrams & Ferris, Illustr. Fl. Pacif. States, pr. 2, 4: 730. 1965; Troncoso in Cabrera, Fl. Prov. Buenos Aires 5: 128 & 132. 1965; Hirata, Host Range & Geogr. Distrib. Powd. Mild. 277. 1966; Meyer & Weyrauch, Inst. Mig. Lill. Misc. 23: 64 & 123. 1966; Rzedowski & McVaugh, Contrib. Univ. Mich. Herb. 9: 76 & 107. 1966; Abrams, Illustr. Fl. Pacif. States, pr. 2, 3: 610. 1967; Mueller-Dombois & Lamoureux, Pacif. Sci. 21: 298. 1967; Ornduff, Reg. Veg. 50: 86. 1967; Alzate, Pl. Medic., ed. 7, 264—265. 1968; Pollak-Oltz, Anal. Anthropol. Gesell. Wien 98: 51—58. 1968; Kunkel, Willdenowia 4: 351. 1968; Moldenke, Phytologia 16: 87, 97—99, 101, 102, & 342. 1968; Moldenke, Résumé Suppl. 16: 4, 6, 11, & 28 (1968) and 17: 3 & 7. 1968; Munz, Suppl. Calif. Fl. 101. 1968; Munz & Keck, Calif. Fl. 686, 687, & 1679. 1968; W. T. Pope, Man. Wayside Pl. 192, pl. 110. 1968; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 717. 1969; Farnsworth, Blomster, Quimby, & Schermerh., Lynn Index 6: 267. 1969; H. L. Mason, Fl. Marshes Calif., pr. 2, 676 & 877. 1969; A. L. Moldenke, Phytologia 18: 126. 1969; Moldenke, Biol. Abstr. 50: 418. 1969; Rickett, Wild Fls. U. S. 3 (2): 364 & [367], pl. 111. 1969; Angely, Fl. Anal. Fitogeogr. Est. S. Paulo, ed. 1,

4: 839, 840, & xix, map 1394. 1970; Dennis, Kew Bull. Addit. Ser. 3: 372. 1970; Gibson, Fieldiana Bot. 24 (9): 230 & 232—233. 1970; Moldenke, Phytologia 20: 80. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1314 & 1318. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876 & 1877. 1970; Oberwinkler, Pterid. & Sperm. Venez. 19, 20, & 78. 1970; Anon., Biol. Abstr. 52 (3): B.A. S.I.C. S.247. 1971; Farnsworth, Pharmacog. Titles 6 (9): xii & title 16428. 1971; Moldenke, Biol. Abstr. 52: 1316. 1971; Moldenke, Excerpt. Bot. 18.A: 445. 1971; Moldenke in Wiggins & Porter, Fl. Galáp. Isls. 504—508, fig. 133. 1971; Moldenke, Fifth Summ. 1: 27, 47, 49, 59, 64, 66, 76, 81, 82, 84—86, 89, 91, 120, 128, 137, 138, 144, 178, 184, 188, 190, 193, 194, 201, 205, 257, 312, 349—351, 353, & 371 (1971) and 2: 558, 559, 649, 652, 654, 655, 672, 674, 679—682, 686, 688, 708, & 916. 1971; Rickett, Wild Fls. U. S. 5 (2): [455], 456, & 665, pl. 152. 1971; Wiggins & Porter, Fl. Galáp. Isls. 997. 1971; Moldenke, Phytologia 22: 478 & 489 (1972) and 23: 182, 185, 225, & 233. 1972.

Additional illustrations: Noack, Biol. Zentralbl. 57: 386, fig. 10. 1937; Schnack, Fehleisen, & Cocucci, Revist. Fac. Agron. La Plata 35: [54], fig. 3. 1959; W. T. Pope, Man. Wayside Pl. 192, pl. 110 [as *V. bonariensis*]. 1968; Moldenke in Wiggins & Porter, Fl. Galáp. Isls. [507], fig. 133. 1971.

Recent collectors describe this plant as an herb to 1.5 m. tall and have found it growing in low-lying grasslands near rivers, in fields, in limestone sinks with steep walls in oak woods, in dense woodlands, cloud forests, open fields, and second-growth, in potreros and cultivated areas, on valley floors, grassy valley floors, wet land, and high ridges, along roadsides and wet roadsides in the open sun, streambanks, and village fencerows, by small ponds in *Pinus-Liquidambar* forests, at the edge of ditches, and among scrubby growth on hilltops.

Pennington claims that *V. litoralis* is an "excellent pasturage plant". Mears found it to be "fairly common in open sunlight" in San Luis Potosí, Mexico, while the Andersons call it an "abundant roadside weed" in Guerrero. Taylor describes it as a "weed at edge of forest adjacent to old fields in volcanic very moist gray-black soil" in Costa Rica and Tyson refers to it as "common" in Chiriquí, Panama. Duke found it growing in areas receiving about 80 inches of annual rainfall. Mueller-Dombois & Lamoureux (1967) state that it is found in two of the "kipukas" in Hawaii Volcanoes National Park, these being older areas on the slopes of volcanic mountains that have been surrounded by more recent lava flows, serving as vegetation islands providing seed sources for the re-invasion of the surrounding new volcanic material.

The corollas are described as having been "blue" on Anderson & Anderson 4928, Breedlove 14429, Contreras 5241, J. A. Duke 9072, Ebinger 811, Laughlin 652, Lewis, Burch, Dwyer, Elias, Escobar, Oliver, & Robertson 339, Williams, Molina R., Williams, & Gibson 29384, and Woodson, Allen, & Seibert 858, "pale-blue" on Breedlove & Thorne 17993, "bluish" on Herb. Inst. Miguel Lillo 738,

"dark-blue" on P. H. Allon 1412, "bright lavender-blue" on Seibert 169, "lilac" on E. Contreras 6152, Molina R. 22258, and Molina R. & Molina 24265, "magenta" on Tyson, Dwyer, & Blum 4300, "lavender" on Bunting & Licht 976, Croat 10444, R. McVaugh 16949, C. W. Palmer 105, Tyson 5627 & 5675, and E. H. Walker 8127, "pale-lavender" on Camp 2433 and E. H. Walker 8103, "pink" on Gentle 6481, "pinkish" on Gentle 7119, "purple" on Blum, Olson, & Rasmussen 2409, F. R. Fosberg 27947, Gutiérrez R. 58, and Martínez-Calderón 1471, "light-purple" on J. W. L. Robinson 8, "pale-purple" on Molina R., Burger, & Wallenta 16234, and "pale-violet" on Asplund 18329.

Schnack and his associates (1959) report this species to be apomictic in its natural method of reproduction. The vernacular names, "cotacán", "mountain verbena", "verbena de montaña", and "verbena fina", have been recorded for this species (in addition to the names previously reported by me). Peckolt (1904) records the vernacular name "herva de pai S. Caetano", which he translates as "Cajetans Vaterkraut". He describes the plant as "Meterhohe Pflanze mit sitzenden, lanzettlichen Blättern. Blüten blau in kurzen, zylindrischen Ähren. Wird allgemein als Ersatz der Verbena officinalis L. benutzt." Judging from his brief description, it seems that he has misapplied the specific name to V. brasiliensis Vell., which has sessile leaves. He is not alone in making this misidentification! The "Verbena litoralis" of Mason (1969) is certainly also actually V. brasiliensis, and the illustration given by Rickett (1969) and labeled as depicting V. bonariensis and "V. littoralis" actually shows V. bonariensis (in the foreground) and V. brasiliensis (in the rear).

Kunkel (1968) is of the opinion that the "V. hispida Ruiz & Pav." of Reiche [Anal. Mus. Nac. Chile, 1903] is actually V. litoralis — he cites Kunkel R.70 from La Mocha Island, Chile. In regard to New Zealand material, Healy comments that "this plant appears to have been included under V. officinalis [in previous literature], but is markedly different from southern [New Zealand] plants".

Alzate (1968) confirms Peckolt's statement that V. litoralis can be used as a substitute for V. officinalis in South American folk medicine. Cheymol (1937) reports the presence of verbenal-oxide in V. litoralis. Ornduff (1967) and Munz (1968) report its chromosome number as  $2n = 56$ . Cuatrecasas (1958) reports the species from Valle del Cauca, Colombia, and Briquet (1902) cites Wilczek 56 from southern Brazil.

A letter received by me from Julia F. Morton, dated June 2, 1969, is of interest: "The USDA Plant Quarantine people have encountered [V. litoralis] three times in the past month in the possession of travelers coming in from Guatemala. All were raving about the wonderful effect of the 'tea' [made from this plant] in lowering blood pressure. It was first brought to my

attention by a Fort Lauderdale doctor who confirmed that her patient's blood pressure went down after taking this remedy. It coincided with the first time the USDA people saw a bundle of the dried plant being brought in by a 70-year-old man."

Troncoso (1965) gives the overall distribution of the species as "América cálida y templada. Común en campos secos y altos, invasore de cultivos", citing Cabrera 1710, Rodríguez 93, and Troncoso s.n. [Herb. San Isidro 1493] from Buenos Aires, Argentina. She reduces V. brasiliensis Vell. to synonymy under V. litoralis, but the two species are abundantly distinct. Munz (1968) comments under V. brasiliensis "Confused with V. litoralis HBK, but the infl. more condensed, the pubescence of rachis, bracts and calyx more spreading". He then separates them as follows: V. litoralis -- inflorescence lax, elongate; flowers distant; pubescence on rachis, bractlets, and calyx very minute, closely appressed.

V. brasiliensis -- inflorescence dense, contracted; flowers mostly congested; pubescence on rachis, bractlets, and calyx spreading.

Macbride (1960) notes that "Hooker and Schauer added a [second] 't' to the name; the former remarked [Hook. Bot. Misc. 1: 166. 1830]: seems to be a variety [of V. bonariensis] with shorter spikes than usual" -- but here, again, the plant actually referred to is V. brasiliensis. Macbride continues with the remarkable statement that "Actually, most material referred here seems doubtfully distinct from V. carolina L.", but the Mexican and Central American V. carolina really has very little resemblance to V. litoralis. He cites the following Peruvian specimens of V. litoralis: Amazonas: Williams 7534. Arequipa: Guenther & Buchtien 132. Cajamarca: Bonpland s.n. [Truxillo], Osgood & Anderson 36. Cuzco: Herrera 1505, 1664, & 3362. Huánuco: Macbride 1705, Woytkowski 34175. Junín: Schunke 1724. Lima: Killip & Smith 21541, Macbride 54. Loreto: Williams 1297, 4367, & 7894. San Martín: Williams 5911.

Macbride notes that Humboldt, Bonpland, & Kunth (1817) "gave Truxillo, Santa and Lima specimens as type collections" -- actually cotype collections -- but he designates the Truxillo one as the "type", which, under the present edition of the International Rules of Botanic Nomenclature, he is entitled to do. In this connection it should be noted that the photograph cited below of Nuttall s.n. [Wahoo] indicates that the type of V. nudiflora Nutt. is deposited in the British Museum herbarium.

Hitherto the poor specimen in the herbarium of the Academy of Natural Sciences at Philadelphia has been regarded by the curators there as the type, "too valuable" to lend even for examination by a monographer.

Jackson (1924) reports the fungus, Aecidium verbenae Speg., as attacking V. litoralis. He regards A. verbenicola Speg. [not A.

verbenicola Ellis & Kellerman, 1884], A. spegazzinianum Sacc. & Trott., A. elongatum Speg., and A. verbeniphilum Speg. as synonyms of A. verbenae, but admits that "There is some doubt whether or not all the names listed above belong to one species. Spegazzini evidently considered that there were at least two forms. His A. Verbenae he thought to be the aecial stage of Puccinia elongata Speg. The latter, however, seems, from the description, to be a short cycled form." He cites H. S. Jackson 1180, 1272, & 1454 from Rio de Janeiro and 1380 & 1479 from Minas Gerais and São Paulo, Brazil. Hirata (1966) adds Oidium sp. from South America, while Dennis (1970) adds Septoria verbenae Rob. & Desm.

Material of V. litoralis has been misidentified and distributed in some herbaria as V. carolina L., V. ehrenbergiana Schau., V. recta H.B.K., and V. townsendi Svenson. On the other hand, the Nicora 663, distributed as V. litoralis, is actually V. bonariensis L., Cory 50840 is V. brasiliensis Vell., Sagástegui A. 7192 is V. glabrata H.B.K., Rambo 45339 is V. minutiflora Briq. [not V. montevidensis as previously reported by me], Nicora 377 and Troncoso 357 are V. montevidensis Spreng., Edwin & Schunke V. 3746 and López-Palacios 2552 are V. parvula Hayek, and R. V. Moran 5793 & 5817 are V. sphaerocarpa Perry. The Alvarez 951 and Archer 4788, previously cited by me as representing the typical form of Verbena litoralis, seem, rather, to represent its var. caracasana (H.B.K.) Briq.

Additional citations: MEXICO: Chiapas: Breedlove 14429 (Mi, N); Laughlin 652 (Mi). Chihuahua: Pennington 55 (Au--264053). Guerrero: Anderson & Anderson 4928 (Mi). Hidalgo: González Quintero 732 (Au--249483, Ip). Jalisco: Díaz Luna 460 (Mi); R. McVaugh 16949 (N). México: Chavez s.n. [5-V-1963] (Ip); M. E. Díaz 18 (Ac); Mitastein 24 (Ip), 72 (Ip). Michoacán: Hinton 12156 (Se--97689), 12520 (Se--117423). Oaxaca: Camp 2433 (N). Puebla: Gutiérrez R. 58 (Ac). San Luis Potosí: Mears 492a (Au). Sinaloa: Breedlove & Thorne 17993 (Ac). Veracruz: Martínez Calderón 1471 (Mi, N); Rosas R. 512 (Rf). GUATEMALA: El Petén: E. Contreras 6152 (W--2558713); C. L. Lundell 16386 (N). El Quiché: E. Contreras 5241 (Au--278574). Sololá: Molina R., Burger, & Wallenta 16234 (N, N). Department undetermined: Collector undesignated s.n. (Jm). BRITISH HONDURAS: Gentle 6481 (Au--239635, S), 7119 (Mi). HONDURAS: Distrito Central: Gillis 9065 (Ft, Ft. Go); Nelson & Barkley 39458 (Ac). Intibucá: Barkley & Barkley 40349 (Ac). La Paz: Molina R. & Molina 24265 (N). Ocotepeque: A. Molina R. 22258 (N). NICARAGUA: Carazo: F. C. Seymour 570 (Vt). Matagalpa: Bunting & Licht 976 (N); Zelaya M. 2324 (N). COSTA RICA: Alajuela: Molina R., Williams, Burger, & Wallenta 17513 (N). Cartago: R. J. Taylor 4208 (N). Puntarenas: C. W. Palmer 105 (N).

San José: Williams, Molina R., Williams, & Gibson 29384 (N). PANAMA: Chiriquí: P. H. Allen 1412 (E--1190850); Croat 10444 (N); J. A. Duke 9072 (E--1841794); Dwyer & Hayden 7738 (E--1925953); Ebinger 811 (W--2561792); Lewis, Burch, Dwyer, Elias, Escobar, Oliver, & Robertson 339 (E--1881984, W--2589452); Seibert 169 (E--1110249); E. L. Tyson 5627 (E--1980019), 5675 (E--1980017); Woodson, Allen, & Seibert 858 (E--1171088). Panamá: Blum, Olson, & Rasmussen 2409 (E--1974177); Tyson, Dwyer, & Blum 4300 (E--1889209). COLOMBIA: Cundinamarca: Barkley & Wrigley 38838 (Rf); Humbert, Fernandez, Idrobo, & Jaramillo 27159 (N, S). Valle del Cauca: J. W. L. Robinson 8 (W--2563571). Department undetermined: Mutis 3688 (W--1562719). VENEZUELA: Mérida: López-Palacios 2035 (Ft). ECUADOR: Chimborazo: Asplund 15501 (N). El Oro: Asplund 15820 (N). Guayas: Valverde 479 (Ws). Loja: D. H. Knight 781 (Ws). Los Ríos: Játiva & Epling 55 (N). Napo-Pastaza: Asplund 18329 (N). GALAPAGOS ISLANDS: Indefatigable: L. A. Fournier 97 (Rf). PERU: Arequipa: Vargas Calderón 8462 (Ac), 18250 (Ac). Cajamarca: Ugent & Ugent 5512 (W--2558166). Cuzco: Vargas Calderón 14580 (Ac), 17076 (Ac). Lambayeque: F. R. Fosberg 27947 (Rf). BRAZIL: Rio Grande do Sul: Rambo 45117 (Au--122320). BOLIVIA: Santa Cruz: I. Peredo s.n. [23-IV-1946] (Se--130300). PARAGUAY: Woolston 107 (N). ARGENTINA: Buenos Aires: R. Alvarez 314 (N). Catamarca: Brizuela 696 (N); Luna Riso 1058 (N). Formosa: I. Morel 2810 (N), 4369 (N), 4862 (N), 4916 (N). Jujuy: Garolera & Romero s.n. [11-I-1947] (N). Misiones: G. J. Schwarz 5383 (N). San Luis: Varela 739 (N). Santiago del Estero: P. Garcia s.n. [Herb. Inst. Miguel Lillo 738] (N). RYUKYU ISLAND ARCHIPELAGO: Okinawa: E. H. Walker 8103 (W), 8127 (Rf, W--2619387). NEW ZEALAND: North: Healy 50/215 (Nz--70251), 50/218 (Nz--70250). HAWAIIAN ISLANDS: Oahu: Nuttall s.n. [Wahoo; F. G. Mey. photo 3129] (N--photo). AUSTRAL ISLANDS: Raivavae: Whitney Exped. 258 (N).

VERBENA LITORALIS var. ALBIFLORA Moldenke

Additional bibliography: Moldenke, *Phytologia* 13: 206. 1966; Moldenke, *Fifth Summ.* 1: 76, 120, & 144 (1971) and 2: 916. 1971.

VERBENA LITORALIS var. CARACASANA (H.B.K.) Briq.

Additional & emended synonymy: *Verbena caracasana* H.B.K., *Nov. Gen. & Sp. Pl.*, ed. folio, 2: 223. 1817. *Verbena caracasana* Humb. & Bonpl. ex Steud., *Nom. Bot. Phan.*, ed. 1, 872. 1821.

Additional & emended bibliography: Steud., *Nom. Bot. Phan.*, ed. 1, 873. 1821; Barnhart, *Bull. Torrey Bot. Club* 29: 590. 1902; Moldenke, *Phytologia* 16: 99. 1968; Moldenke, *Résumé Suppl.* 16: 7 & 28 (1968) and 17: 3 & 7. 1968; Moldenke, *Fifth Summ.* 1: 120, 128, 184, 188, 201, & 350 (1971) and 2: 660, 680, 916, & 967. 1971.

Recent collectors describe this plant as an upright herb, 0.3-1 m. tall, the calyx green-ochre and the corolla blue (R. F. Steinbach 699) or white (Nevling & Gómez-Pompa 1033), growing at altitudes of 700 to 2020 m. Steinbach describes it as "common" in rocky soil along roadsides in Bolivia, while in New Zealand it is said by Healy to be "established on roadsides and waste land". The latter collector notes that "this plant appears to have been included under V. officinalis [in previous lists of New Zealand plants], but is markedly different from southern [New Zealand] plants."

The R. Alvarez 951 and W. A. Archer 4788, cited below, were previously cited by me as typical V. litoralis H.B.K., but they certainly are not representative of the typical form of that admittedly very variable taxon. They have the appearance of large-spiked V. montevidensis Spreng. and are placed here in V. litoralis var. caracasana tentatively until the true status of this and related taxa can be more fully investigated.

If the following collections actually do represent this variety, then it has been collected in anthesis and fruit in January, February, April, June, and December, it is known in the vernacular as "vervena", and is used as a general remedy for coughs in folk medicine.

Additional & emended citations: MEXICO: Veracruz: Nevling & Gómez-Pompa 1033 (Ac). BOLIVIA: Cochabamba: R. F. Steinbach 699 (W--2533500, Ws). PARAGUAY: W. A. Archer 4788 (N). ARGENTINA: Córdoba: Ruiz Huidobro s.n. [San Martin] (N); Timmermann 71123 (Au--302449). Formosa: I. Morel 2188 (Rf). Jujuy: O'Donell 2914 (N). Santa Fé: R. Alvarez 951 (N). Tucumán: T. Meyer 15121 (Au--122322). NEW ZEALAND: North: Healy 50/74 (Nz--70252, Rf, Z), 50/215 (Nz--93824).

#### VERBENA LITORALIS var. CONGESTA Moldenke

Bibliography: Moldenke, *Phytologia* 20: 80. 1970; Moldenke, *Biol. Abstr.* 52: 1316. 1971; Anon., *Biol. Abstr.* 52 (3): B.A.S.I. C. S.247. 1971; Moldenke, *Excerpt. Bot.* 18.A: 445. 1971; Moldenke, *Fifth Summ.* 1: 76 (1971) and 2: 916 & 973. 1971.

Breedlove & Thorne found this plant growing on steep moist north-facing slopes with Clethra, Cornus, Molinadendron, Ostrya, Pinus, and Quercus, flowering and fruiting in September, and describe the color of the corollas as "blue".

Citations: MEXICO: Sinaloa: Breedlove & Kawahara 16735 (Z--type); Breedlove & Thorne 18277 (Mi).

#### VERBENA LITORALIS var. MELANOPOTAMICA Hauman-Merck

Additional bibliography: Moldenke, *Phytologia* 10: 78--79. 1964; Moldenke, *Fifth Summ.* 1: 201 (1971) and 2: 916 & 973. 1971.

#### VERBENA LOBATA Vell.

Additional bibliography: Barroso, *Rodriguésia* 32: [69] & 70.

1957; Cabrera, Bol. Soc. Argent. Bot. 6: 272. 1957; Angely, Fl. Anal. Paran., ed. 1, 572. 1965; Moldenke, Phytologia 16: 99. 1968; Moldenke, Résumé Suppl. 16: 6. 1968; Angely, Fl. Anal. & Fitogeogr. Est. S. Paulo, ed. 1, 1: xli. (1969) and 4: 839, 840, & xix, map 1394. 1970; Moldenke in Menninger, Flow. Vines 338. 1970; Moldenke, Fifth Summ. 1: 178, 190, & 201 (1971) and 2: 657, 664, 681, 682, & 916. 1971.

Additional citations: BRAZIL: Rio Grande do Sul: Palacios & Cuezco 895 (N).

VERBENA LOBATA var. GLABRATA Moldenke

Additional bibliography: Moldenke, Phytologia 12: 207. 1966; Moldenke, Fifth Summ. 1: 178 & 190 (1971) and 2: 916. 1971.

VERBENA LOBATA var. HIRSUTA Moldenke

Additional bibliography: Moldenke, Phytologia 16: 99. 1968; Moldenke, Résumé Suppl. 16: 6. 1968; Moldenke, Fifth Summ. 1: 178 & 188 (1971) and 2: 916. 1971.

The corollas on Hatschbach 14898 are described as having been "lilac" in color when fresh.

Additional citations: BRAZIL: Paraná: Hatschbach 14898 (W-2564580).

VERBENA LOBATA var. SESSILIS Moldenke

Additional bibliography: Cabrera, Bol. Soc. Argent. Bot. 6: 272. 1957; Angely, Fl. Anal. Paran., ed. 1, 572. 1965; Moldenke, Phytologia 16: 99. 1968; Moldenke, Fifth Summ. 1: 178 (1971) and 2: 916. 1971.

VERBENA LONGIFOLIA Mart. & Gal.

Additional bibliography: Hocking, Excerpt. Bot. A.11: 504. 1967; Moldenke, Phytologia 14: 288. 1967; Moldenke, Biol. Abstr. 49: 4199. 1968; Moldenke, Fifth Summ. 1: 76 (1971) and 2: 660 & 916. 1971.

Dieterle found this plant growing in flat pastured red clay land with shallow pools in an area of low ground with shallow surface water, describing the color of the corollas as "dark-purple". In addition to the months previously reported by me, the species has been collected in flower and fruit in June.

Additional citations: MEXICO: Guerrero: Ryan & Floyd 84 (Ca-1285492). Jalisco: J. V. A. Dieterle 3578 (Mi).

VERBENA LONGIFOLIA f. ALBIFLORA Moldenke

Additional bibliography: Moldenke, Phytologia 13: 207. 1966; Moldenke, Fifth Summ. 1: 76 (1971) and 2: 916. 1971.

VERBENA LONGIFOLIA var. PUBESCENS Moldenke

Additional bibliography: Hocking, Excerpt. Bot. A.11: 504. 1967; Moldenke, Phytologia 14: 288. 1967; Moldenke, Biol. Abstr. 49: 4199. 1968; Moldenke, Fifth Summ. 1: 76 (1971) and 2: 916. 1971.



## VERBENA LUCANENSIS Moldenke

Additional bibliography: J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 613, 614, & 624--625. 1960; Moldenke, Phytologia 14: 288. 1967; Moldenke, Fifth Summ. 1: 144 (1971) and 2: 916. 1971.

## VERBENA LUDOVICIANA Hirata

Bibliography: Hirata, Host Range & Geogr. Distrib. Powd. Mild. 277. 1966; Moldenke, Fifth Summ. 1: 375 (1971) and 2: 916. 1971.

Nothing is known to me of this plant except that it is listed by Hirata (1966) as a host for the ubiquitous fungus, Erysiphe cichoracearum P. DC. in the United States.

## VERBENA MACDOUGALII Heller

Additional & emended synonymy: Verbena macdougalii Heller ex Moldenke, Suppl. List Invalid Names 9, in syn. 1941; Hirata, Host Range & Geogr. Distrib. Powd. Mild. 277. 1966. Verbena macdougalii Shinn, Univ. Kans. Sci. Bull. 46: 881. 1967.

Additional & emended bibliography: Rydb., Fl. Rocky Mtns., ed. 2, pr. 1, 739 & 740. 1922; Tidestr., Contrib. U. S. Nat. Herb. 25 [Fl. Utah & Nev.], pr. 1, 469. 1925; Wyman & Harris, Navajo Ind. Ethnobot. [Univ. N. M. Bull. 366 (Anthrop. Ser. 3, 5):] 32 & 45. 1941; Rydb., Fl. Rocky Mtns., ed. 2, pr. 2, 739 & 740. 1954; Howell & McClintock in Kearney & Peebles, Ariz. Fl., ed. 2, 725--727. 1960; Lewis & Oliv., Am. Journ. Bot. 48: [639]--641, fig. 17. 1961; Hocking, Excerpt. Bot. A.6: 91. 1963; Hirata, Host Range & Geogr. Distrib. Powd. Mild. 277. 1966; Shinn, Univ. Kans. Sci. Bull. 46: 881. 1967; Burlage, Ind. Pl. Tex. 184, 206, 223, & 242. 1968; Moldenke, Phytologia 16: 188--189. 1968; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 717. 1969; A. L. Moldenke, Phytologia 18: 126. 1969; Rydb., Fl. Rocky Mtns., ed. 2, pr. 3, 739 & 740. 1969; Tidestr., Contrib. U. S. Nat. Herb. 25 [Fl. Utah & Nev.], pr. 2, 469. 1969; Rickett, Wild Fls. U. S. 3 (2): 365 (1969) and 4 (3): 540, [541], & 799, pl. 176. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876 & 1877. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1315 & 1320. 1970; Moldenke, Fifth Summ. 1: 50, 51, 59, 62, 63, & 371 (1971) and 2: 682 & 916. 1971.

Additional & emended illustrations: Lewis & Oliv., Am. Journ. Bot. 48: 640, fig. 17. 1961; Rickett, Wild Fls. U. S. 4 (3): [541], pl. 176 [in color]. 1970.

Recent collectors have found this plant growing in forests and open woodlands, in subalpine meadows, on rocky hillsides with Pinus ponderosa and Abies concolor, and along subalpine roadsides, at altitudes up to 10,000 feet. Howell & McClintock (1960) state that in Arizona it is found mostly in pine forests from 6000 to 7000 feet altitude, blooming from June to September, while Demaree reports it as "common in rocky open wooded bottoms" in New Mexico. Andrew and Alison Moldenke have reported to me that "V. macdougalii is just as common, if not more so, at the Grand Canyon and to/from Flagstaff [Arizona], but only in weedy areas. We

haven't seen a single plant here in non-disturbed areas — none at all in 500 miles of N. Arizona and S. Utah."

Common names for the species, in addition to those previously reported by me, are "dormillon" and "Macdougal verbenae". Burlage (1968) reports that "a tea of this is drunk as a diuretic [in Texas] and the green leaves are mashed and used for toothache". Hirata (1966) records the fungus, *Erysiphe cichoracearum* P. DC., as attacking this plant. The H. R. Bennett 8055, distributed as V. macdougalii, is actually mut. rosella Cockerell, while Johnston & Muller 877 is V. scabra Vahl.

Additional citations: COLORADO: Conejos Co.: W. A. Weber 7865a (Se--145178). NEW MEXICO: Colfax Co.: Mahler 861 (Au--248858). Lincoln Co.: W. Hess 260 (Se--226055); Tucker 3209 (Se--184025); Wooton & Standley 47452 (Ws). McKinley Co.: Baad 1076 (Se--236110). Otero Co.: Baad 798 (Se--236953); Demaree 50949 (Ac), 60788 (Rf); Iwen & Iwen 202 (Ws). San Miguel Co.: R. S. Ferris 11521 (Se--189506); Rowlett 42 (Au--254348); Studhalter & Marr S. 1836 (Lk). Taos Co.: Kempers 94 (Sd--64213). ARIZONA: Coconino Co.: G. N. Jones 21040 (Se--199522).

#### VERBENA MACDOUGALII f. ALBIFLORA Moldenke

Additional bibliography: Moldenke, *Phytologia* 10: 117--119. 1964; Moldenke, *Fifth Summ.* 1: 51 & 62 (1971) and 2: 916. 1971.

#### VERBENA MACDOUGALII mut. ROSELLA Cockerell

Additional bibliography: Moldenke, *Phytologia* 10: 118. 1964; Moldenke, *Fifth Summ.* 1: 62 (1971) and 2: 916. 1971.

Bennett encountered this plant at 7300 feet altitude in the Transition Zone, flowering in July. He describes the corolla color as "rose". It has been misidentified and distributed in some herbaria as typical V. macdougalii Heller.

Additional citations: NEW MEXICO: San Miguel Co.: H. R. Bennett 8055 (Go, W--2446278).

#### VERBENA MACRODONTA Perry

Additional bibliography: Moldenke, *Phytologia* 10: 118--119. 1964; Moldenke, *Fifth Summ.* 1: 76 (1971) and 2: 916. 1971.

#### VERBENA MACROSPERMA Speg.

Additional bibliography: Moldenke, *Phytologia* 16: 100. 1968; Moldenke, *Fifth Summ.* 1: 201 (1971) and 2: 916. 1971.

#### VERBENA MALMII Moldenke

Additional bibliography: Angely, *Fl. Anal. Paran.*, ed. 1, 572. 1965; Moldenke, *Phytologia* 13: 208. 1966; Moldenke, *Fifth Summ.* 1: 178 (1971) and 2: 682 & 917. 1971.

#### VERBENA MARITIMA Small

Additional bibliography: J. A. Clark, *Card Ind. Gen. Sp. Var.* issue 141. 1933; Greene & Blomquist, *Fls. South* 109. 1953; Molden-

ke, *Phytologia* 16: 100. 1968; Anon., *Torrey Bot. Club Ind. Am. Bot. Lit.* 3: 308. 1969; Moldenke in Menninger, *Flow. Vines* 338, ph. 284. 1970; Long & Lakela, *Fl. Trop. Fla.* 741 & 961. 1971; Moldenke, *Fifth Summ.* 1: 10 & 30 (1971) and 2: 521, 525, 653, & 917. 1971.

Additional illustrations: Greene & Blomquist, *Fls. South* 109. 1953; Moldenke in Menninger, *Flow. Vines* ph. 284. 1970.

O'Neill encountered this species in low pinelands. Greene & Blomquist (1953) call it "seaside-verbena" and describe it as "another flat-topped verbena, the only species often frequenting coastal situations of dunes, dry pinelands, and hammocks. Flowers range from rose to bright-purple. Plants spreading to widely creeping. S. peninsular of Fla."

Additional citations: FLORIDA: Brevard Co.: P. O. Schallert 20869 (Se--200558); B. Sharp s.n. [9.IV.68] (Ws). Dade Co.: O' Neill 7596 (Mi). Flagler Co.: J. K. Small s.n. [Ocean City, April 18, 1922] (Se--162929). Indian River Co.: J. K. Small s.n. [Near Sebastian, June 1928] (Ca--1216765, N). Jupiter Island: Small, Mosier, & DeWinkeler 10891 (Se--198405).

#### VERBENA MARRUBIOIDES Cham.

Additional bibliography: Angely, *Fl. Anal. Paran.*, ed. 1, 572. 1965; Moldenke, *Phytologia* 16: 100. 1968; Moldenke, *Fifth Summ.* 1: 144, 178, 190, & 201 (1971) and 2: 662, 675, & 917. 1971.

The corollas on Hatschbach 12843 are described as having been "lilac" when fresh. This same distinguished collector, on the label of his no. 17120, notes "repente, flôr lilaz, intenso; campo sêco, prefere campo esgotado e também barrancos".

Additional citations: BRAZIL: Paraná: Hatschbach 12843 (W--2564873), 17120 (Ft, N, W--2536531).

#### xVERBENA MATRITENSIS Moldenke

Additional bibliography: Moldenke, *Phytologia* 14: 289. 1967; Moldenke, *Fifth Summ.* 1: 372 (1971) and 2: 660, 673, & 917. 1971.

#### VERBENA MEGAPOTAMICA Spreng.

Additional synonymy: Glandularia megapotámica Schnack & Covas, *Revist. Argent. Agron.* 12: 224. 1945.

Additional & emended bibliography: J. A. Clark, *Card Ind. Gen. Sp. Var.* issue 185. 1944; Schnack & Covas, *Revist. Argent. Agron.* 12: 222--229, fig. 1 B & C, 2 A--C, 3 D--G, & pl. 12 A, B, E, & H. 1945; Cabrera, *Man. Fl. Alred. Buenos Aires* 397 & 398. 1953; Michalowski, *Serv. Tecn. Interam. Coop. Agr. Bol.* 169 & 175. 1954; Darlington & Wylie, *Chrom. Atl.*, pr. 1, 323. 1956; Schnack, Fehleisen, & Cocucci, *Revist. Argent. Agron.* 24: 129--135, pl. 1, A, B, E, & F, & fig. 1. 1957; Darlington & Wylie, *Chrom. Atl.*, pr. 2, 323. 1961; Angely, *Fl. Anal. Paran.*, ed. 1, 572. 1965; Troncoso in Cabrera, *Fl. Prov. Buenos Aires* 5: 133, 136, & 137, fig. 46 A & B. 1965; Moldenke, *Phytologia* 16: 189 & 196. 1968; Solbrig, Passani, & Glass, *Am. Journ. Bot.* 55: 1239. 1968; Bolkh., Grif, Matvej., & Zakhar., *Chrom. Numb. Flow. Pl.* 715. 1969;

Schnack & Rubens, Bol. Soc. Argent. Bot. 13: 205. 1970; Solbrig, Princ. & Meth. Pl. Biosystem. 76. 1970; Moldenke, Fifth Summ. 1: 178, 188, 190, 201, & 371 (1971) and 2: 521, 683, 689, 690, 694, 700, & 917. 1971; Troncoso, Darwiniana 16: [613]--616 & 621, fig. 1. 1971; Moldenke, Phytologia 23: 239. 1972.

Additional & emended illustrations: Schnack & Covas, Revist. Argent. Agron. 12: 225, fig. 1 B & C, 226, fig. 2 A--C, fig. 3 D--G, & pl. 12 A, B, E, & H. 1945; Schnack, Fehleisen, & Cocucci, Revist. Argent. Agron. 24: 131, fig. 1, & 133, pl. 1 A, B, E, & F. 1957; Troncoso in Cabrera, Fl. Prov. Buenos Aires 5: 136, fig. 46 A & B. 1965; Troncoso, Darwiniana 16: 615, fig. 3. 1971.

Schnack & Covas (1945) and Schnack & Gonzalez (1945) record the chromosome number of this taxon as  $n = 10$ .

Troncoso (1965) cites from Buenos Aires only Burkart 7077 and Cabrera 3401 and gives the distribution of the species as "Sur del Brasil, Uruguay y litoral argentino. Habita en albardones altos y matorrales del Delta y Punta Lara." Schnack & Rubens (1970) record it also from Corrientes, Argentina. The corollas on Boffa s.n. [Herb. Inst. Miguel Lillo 148] are said to have been "lilac" in color. The T. Rojas 2111 and Herb. Inst. Miguel Lillo 107893, distributed as V. megapotamica, are actually V. incisa Hook.

Troncoso (1971), in a recent very splendid paper, reviews the history of this species nomenclaturally and critically compares three closely related taxa, separating them as follows:

- "A. Hierbas o sufrútices subglabros y lisos, con pelitos estrigosos en tallos y hojas. Cáliz raramente estrigoso, pelitos antrorsos apretados a la superficie y por lo general con glándulas subsésiles, pateriformes, antociáncias, sobre las costillas. Brácteas oval-oblongas o lanceolado-subuladas, ciliadas, de 2--5 mm long.....G. megapotamica.
- A'. Hierbas o sufrútices áspero-hirsútulos, con pubescencia variada simple y glandulosa en tallos y hojas. Cáliz ya sea con pelos largos patentes y pelitos rígidos más breves, o bien densamente cano-retrorso-pubescente, en ambos casos por lo general con pelitos glandulares estipitados entremezclados. Brácteas ovales o lanceoladas, pubescentes o pestafiosas.
- B. Brácteas lanceoladas, de unos 5 mm long., pestafiosas, por lo demás subglabras. Tubo corolar de 16--18 mm long. Hojas oval-oblongas, brevemente cuneadas en la base, hipofilo cano-hispido sobre los nervios, reticulado hirsútulo por breves pelitos derechos, rígidos. Cáliz con pelos largos patentes, pelitos subrígidos breves y pelitos glandulares estipitados. Mericarpios de 3,5--4,5 mm. long.....G. phlogiflora.
- B'. Brácteas ovales u oval-lanceoladas de 1--2 mm long., hispido-pubescentes principalmente en la base y bordes. Tubo corolar de 19--22 mm long. Hojas oblongo o triangular-lanceoladas, subtruncadas o brevemente cuneadas en la base, hipofilo hirsútulo. Cáliz densamente cano-pubes-

cente, pubescencia por lo general retrorso, y pocos pelitos glandulares estipitados entremezclados. Mericarpios de 5--6 mm long.....G. guaranitica."

She gives its distribution as "Sur del Brasil, Uruguay y NE de la Argentina hasta las barrancas del Río de la Plata. Habita en pajonales y albardones altos de las islas del Delta." She cites the following specimens: BRAZIL: Rio Grande do Sul: Isabelle s.n. [1835] (K); Sellow s.n. (K, V). URUGUAY: Osten 5389 (Si); Sellow 3162 (K). ARGENTINA: Buenos Aires: Boffa 148 (Si); A. Burkart 7019 (Si), 22403 (Si--983, Si--16063); Lanfranchi 496 (Si). Entre Ríos: A. Burkart 5127 (Si), 8293 (Si), 15134 (Si), 27055 (Si); Boelke 915; Hunziker 4625.

Additional citations: ARGENTINA: Buenos Aires: Boffa s.n. [Herb. Inst. Miguel Lillo 148] (N); A. Burkart 22403 (W--2567980).

#### VERBENA MENDOCINA R. A. Phil.

Additional & emended bibliography: Reiche & Phil., Fl. Chil. 5: 295 & 463. 1910; J. A. Clark, Card Ind. Gen. Sp. Var. issue 184. 1944; Darlington & Wylie, Chrom. Atl., pr. 1, 323. 1956; J. F. Macbr., Field Mus. Publ. Bot. 13 (5): 629. 1960; Darlington & Wylie, Chrom. Atl., pr. 2, 323. 1961; Troncoso in Böcher, Hjerting, & Rahn, Dansk Bot. Arkiv 22 (1): 109. 1963; Hocking, Excerpt. Bot. A.10: 270. 1966; Moldenke, Phytologia 16: 189. 1968; Bolkh., Grif, Matvej., & Zakhar., Chrom. Numb. Flow. Pl. 715 & 717. 1969; Moldenke, Fifth Summ. 1: 190, 201, & 371 (1971) and 2: 521, 683, 688, & 917. 1971.

Troncoso (1963) cites Böcher, Hjerting, & Rahn 2070, collected at an altitude of 1650 meters. Beetle (1943) classifies this species in the Cruciferae, doubtless through some stenographic error. He reports that Macloskie is of the opinion that Patagonia depends on constant replenishment of its flora from the Andean mountain chain; Neger suggests that the river courses are probably the migratory lanes for the entrance of such plants as Verbena mendocina.

#### VERBENA MENTHAEFOLIA Benth.

Additional bibliography: Abrams, Illustr. Fl. Pacif. States, pr. 1, 3: 610, 611, & 616, fig. 4343. 1951; Howell & McClintock in Kearney & Peebles, Ariz. Fl., ed. 2, 726 & 728. 1960; Ferris in Abrams & Ferris, Illustr. Fl. Pacif. States, pr. 1, 4: 651 & 730 (1960) and pr. 2, 4: 651 & 730. 1965; Abrams, Illustr. Fl. Pacif. States, pr. 2, 3: 610, 611, & 616, fig. 4343. 1967; Moldenke, Phytologia 16: 100--101. 1968; Munz & Keck, Calif. Fl. 686, 687, & 1679. 1968; Rickett, Wild Fls. U. S. 3 (2): 364 (1969) and 4 (3): 540 & 799. 1970; Gibson, Fieldiana Bot. 24 (9): 230 & 233. 1970; Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1876 & 1877. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1314 & 1318. 1970; Moldenke, Fifth Summ. 1: 59, 63, 66, 76, 81, 206, & 371 (1971) and 2: 674, 682, 683, 686, 687, 695, 697, & 917. 1971; Moldenke, Phytologia 22: 473 & 499 (1972) and 23: 184 & 188. 1972.

Additional illustrations: Abrams, *Illustr. Fl. Pacif. States*, pr. 1, 3: 616, fig. 4343 (1951) and pr. 2, 3: 616, fig. 4343. 1967.

Recent collectors have found this plant growing in pastizal, matorral, Opuntia matorral, woods, oak or pine and oak woods, cultivated ground and old cultivated fields, on slopes with pine-oak woods, on grassy banks and low banks near water, and at the edge of lakes, flowering (in addition to the months previously reported by me) and fruiting in November. González Quintero found it in shrubby matorral of Juniperus in Hidalgo, Mexico, while in the same state Mears reports it growing in association with Cassia, Cuphea, Indigofera, Juniperus, Mimosa, Phoradendron, Quercus, and Teucrium. In Zacatecas it was encountered in well-drained soil in full sun on a level plateau with microphyll desert scrub of the Prosopis-Acacia association by Detling. Breedlove describes it as a suffrutescent perennial growing under shrubs on tablelands heavily covered with shrubs in Sonora, while he and Kawahara found it on slopes with Arbutus xalapensis, Quercus epileuca, Q. urbani, Pinus ayacahuite, and P. lumholzii in Sinaloa. Cruz C. and Vargas N. came upon it on "ladera basáltica con vegetación de matorral de Acacia y Opuntia" in México and in "terrenos fangosos" in Hidalgo. In the state of México, also, Morales Díaz found it on "ladera andesítica con vegetación secundaria" and Rico A. in "encinar abierto y pastizales". An additional vernacular name variant is "telran".

The corolla is described as having been "very faint purple" on Hinton 11991, "red-purple" on Lagunas & Castillo 17, "purple" on Rico A. 31, J. Rzedowski 1088, 20302, & 22205a, "violet" on Franco R. s.n. and García Saucedo s.n., "pale-lavender" on Dieterle 3574, "blue" on Breedlove 1498, and "pale-blue" on Breedlove & Kawahara 16815.

Pennington reports that in Chihuahua and Sonora the entire plant is boiled in preparing a tea for use by the natives against stomach disorders and to stop vomiting, and also that goats browse upon the plant.

Howell & McClintock (1960) cite Jones s.n. [near Yuma, 1906]. Material has been misidentified and distributed in some herbaria under the names V. bipinnatifida var. latilobata Perry, "V. neomexicana (A. Gray) Small", and V. pinetorum Moldenke. The J. Rzedowski 22205a, cited below, is a mixture with V. ciliata Benth., while Franco R. s.n. [20.VIII.1967], García Romero s.n. [11/VIII/1968], and Márquez s.n. [23/VII/1962] are mixtures with V. carolina L. The R. Pearce 2276, distributed as V. menthaefolia, is actually V. halei Small, while Pinkava, Keil, & Lehto 14553 is V. neomexicana var. xylopoda Perry.

Additional citations: MEXICO: Baja California: Mrs. F. Wylie s.n. [April 8, 1950] (Sd--43915). Chihuahua: Kruckeberg 4928 (Se--207495); Pennington 43 (Au--287715); Stuessy 990 (Au--257464). Federal District: Huerta M. 42 (Ip); Márquez s.n. [23/

VII/1962] (Ip); J. Rzedowski 1088 (Au--241215, Ip); Villegas D. 80 (Ip), 550 (Ip). Hidalgo: Chávez O. s.n. [4.VIII.1963] (Ip); Cruz C. 407 (Ac); García Saucedo s.n. [10.IX.1966] (Ip); González Quintero 257 (Ip), 304 (Ip), 931 (Ip), 994 (Ac), 1265 (Ip), 2590 (Ip), 2882 (Ip, Mi); Lagunas & Castillo 17 (Ip); Mears 259a (Au--255097), 326a (Au--254967). Jalisco: J. V. A. Dieterle 3574 (Mi). México: Cruz C. 564 (Mi); Franco R. s.n. [20.VIII.1967] (Ip); Morales Díaz s.n. [22/VII/1962] (Ip); Rebolledo Vélez s.n. [20.VIII.1967] (Ip); Rico A. 31 (Rf); J. Rzedowski 20302 (Rf), 22205a, in part (Ip), 22207a (Ip), 24086 (Ip); Vargas N. s.n. [24.IV.1966] (Ip). Michoacán: García Romero s.n. [11.VIII.1968] (Ip); Hinton 11991 (Mi, Se--117442). Sinaloa: Breedlove & Kawahara 16815 (Rf). Sonora: Breedlove 1498 (Au--232106); Pennington 66 (Au--287642), 98 (Au--287612). Veracruz: Dodds 91 (N). Zaca-tecas: Detling 9436 1/2 (Ip). State undetermined: J. Rzedowski 1133 [La Candelaria] (Ip).

#### xVERBENA MERETRIX Moldenke

Additional bibliography: Moldenke, *Phytologia* 11: 472. 1965; Moldenke, *Fifth Summ.* 1: 371 (1971) and 2: 674, 686, & 917. 1971.

#### VERBENA MICROPHYLLA H.B.K.

Emended synonymy: Verbena microphylla Humb. & Bonpl. ex Steud., *Nom. Bot. Phan.*, ed. 1, 873. 1821. Glandularia microphylla (H.B.K.) Cabrera, *Revist. Invest. Agríc.* 11: 398. 1958.

Additional bibliography: Cabrera, *Revist. Invest. Agríc.* 11: 332 & 398. 1957; Cabrera, *Bol. Soc. Argent. Bot.* 7: 150. 1958; J. A. Clark, *Card Ind. Gen. Sp. Var.* issue 228. 1958; J. F. Macbr., *Field Mus. Publ. Bot.* 13 (5): 614 & 625--626. 1960; Troncoso in Böcher, Hjerting, & Rahn, *Dansk Bot. Arkiv* 22 (1): 109. 1963; Meyer & Weyrauch, *Inst. Mig. Lill. Misc.* 23: 33 & 123. 1966; G. Taylor, *Ind. Kew. Suppl.* 13: 61. 1966; Moldenke, *Phytologia* 16: 101 & 206. 1968; Schnack & Rubens, *Bol. Soc. Argent. Bot.* 13: 205. 1970; Moldenke, *Fifth Summ.* 1: 137, 144, 184, 190, 193, & 201 (1971) and 2: 521, 541, 678, 684, & 917. 1971; Moldenke, *Phytologia* 23: 199. 1972.

Recent collectors have encountered this plant on grazed grassy paramos. Macbride (1960) comments that the species is "Scarcely more than a part of V. laciniata (L.) Briq. but perhaps recognizable and apparently a high Andean state; listed by Ball as 'V. diffusa Willd.'" He gives its extra-Peruvian distribution as "To Uruguay and Ecuador" and cites the following collections from Peru: Ancash: Macbride 171, Weberbauer 3042. Ayacucho: Ferreyra 5509. Cuzco: Vargas 9827. Lima: Ball s.n., Ferreyra 3531, Macbride 169, Weberbauer 226. Puno: Pennell 13359, J. Sharpe 58, Soukup 70 & 870. Troncoso (1963) cites Kurtz 108.

The Cabrera (1957) reference cited above is sometimes cited as "1958", but is plainly dated "1957" in the original.

[to be continued]